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Florida Scientist

Volume 38 Supplement 1

Program Issue

THIRTY NINTH ANNUAL MEETING OF THE ACADEMY

in conjunction with

THE FLORIDA JUNIOR ACADEMY OF SCIENCE

and

THE FLORIDA SECTION OF

THE AMERICAN ASSOCIATION OF PHYSICS TEACHERS

featuring the Academy Symposium

LAND SPREADING OF SECONDARY EFFLUENT

Florida Southern College

Lakeland, Florida

March 20, 21, 22.

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QUARTERLY JOURNAL OF THE FLORIDA ACADEMY OF SCIENCES

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1974-1975

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Thirty-Ninth Annual Meeting
# of the
Florida Academy of Sciences
at
Florida Southern College
Lakeland, Florida
March 20, 21, 22, 1975

GENERAL INFORMATION

All registrants for the Senior and Junior Academy meetings and the meeting of the American Association of Physics Teachers are welcome to atend all sessions of all organizations, including the banquet.

Meetings The Academy meetings will all take place in or near Polk Science Bldg. on the campus of Florida Southern College.

Registration

A registration desk will be located at Ramada Inn on March 20 from 7pm to 10pm. Registration fee is $5.00. The registration desk will move to Polk Science Bldg. on the morning of March 21.

Transportation

Limousine Service to Lakeland from Tampa Airport may be obtained by reservation with Florida Limousine Service at least two days prior to arrival time in Tampa. When making reservations, list Airline, flight number, and arrival time. The charge from Tampa Airport to any destination in Lakeland is $7.50 per person.

Transportation will be provided Friday and Saturday between the Ramada Inn and the Florida Southern campus.

Parking See campus map on the rear cover for parking areas.

Lodging The Ramada Inn will serve as the headquarters motel. Ramada Inn requests that you make reservations with them no later than March 14. Room rates will be:

Single	$13.00	
Twin Double	16.00	(up to 3 persons)
Twin Double	18.00	(4 persons)

To make reservations, write or call

Ramada Inn Motel
601 E. Memorial Blvd.
Lakeland, FL 33801
Tel: area code 813
683-5961

Other motels within walking distance of Ramada Inn include:

Best Western Motel
508 E. Memorial Blvd.
Lakeland, FL 33801
Tel: area code 813
683-7471

Holiday Inn North
910 E. Memorial Blvd.
Lakeland, FL 33801
Tel: area code 813
682-0101

Food Services

Meals may be obtained at the Florida Southern College Cafeteria, located on the east side of the campus, during the following hours:

	Weekdays	Sat.-Sun.
Breakfast	7:15 - 8:45	8:00 - 9:00
Lunch	11:00 - 1:30	11:45 - 1:00
Dinner	4:30 - 6:00	5:00 - 6:00

Cost for breakfast, lunch, and dinner is $1.35, $2.00, and $2.50, respectively.

Academy Banquet

The Academy Banquet will be Friday, March 21, at 7pm in the Colligiate and Lake Rooms of the Florida Southern Cafeteria Bldg. A Deluxe Buffet is planned with a cost of $6.00 per person.

Peter P. Baljet, Executive Director of the Department of Polution Control, will be the speaker.

Field Trip

There will be a field trip Saturday on the geological aspects of the Lakeland area, sponsored by the Earth and Planetary Sciences section.

Cash Bar

Ramada Inn will provide a cash bar ($1.00 per drink) from 7pm to 10pm on March 20.

Entertainment

A musical concert titled "Piano Et Cetera" (A Program of Music and the Spoken Word) will be performed by FSC's own Ingrid and Robert MacDonald. Complimentary tickets for the Thursday evening performance will be provided at the Theater door to FAS registrants and their families. Time: March 20, 8:15 p.m. Place: Loca Lee Buckner Theater on the Florida Southern College campus.

A Planetarium lecture, including a show in the Star Chamber, will be presented Friday morning by Prof. George Robinson, Planetarium Director of Florida Southern College. Time: March 21, 10 a.m. Place: Planetarium, Polk Science Bldg.

Local Arrangements Committee

Chairmen-------- James H. Stamper and Thomas M. Willard
Audio-visual---- John Tripp
Exhibts--------- Howard Dinsmore
Hospitality----- Laurence Campbell
Publicity------- John Haldeman

PROGRAM OF EVENTS

Florida Academy of Sciences

Thursday Afternoon, March 20, 1975

1:00 - 6:00	Earth & Planetary Sciences Section		
	Session A	Science 137	Pg.12
	Session B	Science 135	Pg.15
3:00	Executive Council Meeting	Collegiate Room, Cafeteria	
6:00	Council Dinner	Collegiate Room, Cafeteria	
7:00 - 10:00	Social Hour	Ramada Inn	

Friday Morning, March 21, 1975

9:15 - 12:00	Zoology-Biological Sciences Section	Science 124	Pg. 5
10:45- 12:00	Botany-Biological Sciences Section	Science 107	Pg. 8
7:40 - 12:00	Earth & Planetary Sciences Section		
	Session A	Science 137	Pg.18
	Session B	Science 135	Pg.20
8:45 - 12:00	Medical Sciences Section	Science 203	Pg.24
8:30 - 12:30	Physical Sciences Section	Science 220	Pg.26
9:00 - 11:40	Science Teaching Section	Science 204	Pg.31
8:45 - 12:00	Social Sciences Section	Science 206	Pg.33

Friday Afternoon, March 21, 1975

12:50	Business Meeting of the Academy	Collegiate Room, Cafeteria	
1:30 - 3:30	Symposium:		
	Landspreading of Secondary Effluents	Science 137	Pg. 4
3:45 - 5:00	Zoology-Biological Sciences Section	Science 124	Pg. 7
3:45 - 5:15	Botany-Biological Sciences Section	Science 107	Pg. 9
3:45 - 5:00	Earth & Planetary Sciences Section	Science 137	Pg.23
3:45 - 5:00	Physical Sciences Section	Science 220	Pg.28
3:45 - 5:00	Social Sciences Section	Science 206	Pg.34

Friday Evening, March 21, 1975

7:00	Annual Academy Banquet	Collegiate Room, Cafeteria	

Saturday Morning, March 22, 1975

9:00 - 11:30	Biological Sciences Section	Science 124	Pg.10
8:30 - 12:30	Physical Sciences Section	Science 220	Pg.28

American Association of Physics Teachers

Saturday Morning, March 22, 1975

9:00 - 12:00	Presentation of Papers	Science 203	Pg.35

Junior Academy of Science

Thursday Afternoon, March 20, 1975

1:00 - 4:30	Senior High Experimental Papers	Annie Pfeiffer Chapel	Pg.36
1:00 - 4:30	Junior High Experimental Papers	Branscomb 202	Pg.37

Friday Morning, March 21, 1975

9:00 - 12:00	Senior High Literary Papers	Annie Pfeiffer Chapel	Pg.38
9:00 - 12:00	Junior High Literary Papers	Branscomb 202	Pg.38

GENERAL INTEREST SESSION

SYMPOSIUM—LAND SPREADING OF SECONDARY EFFLUENTS

Friday 1:30 pm Room Science 137

Rudy J. Wodzinski, Florida Technological University, presiding

1:30 pm Chemical, Physical and Biological Composition of "Typical" Secondary Effluents. Rudy J. Wodzinski, Florida Technological University. The chemical, physical and biological composition of the secondary effluents from municipal treatment plants will be reviewed.

1:40 pm Hydrologic Aspects of Land Disposal at Two Sites in West Central Florida. Ronald C. Reichenbaugh, Geological Survey, Water Resources Division, United States Department of the Interior, Tampa, Florida, 33602. The Geological Survey has investigated water quality aspects of land disposal by sprinkler irrigation using treated secondary effluent at two sites in west-central Florida. 1) on a pasture at the Carpenter's home, north of Lakeland, and 2) on a test-site adjacent to the St. Petersburg North-west sewage-treatment plant. Objectives of both studies were to determine the hydrobiochemical effects of land disposal on the shallow aquifer, and to determine the effectiveness of vegetation, soil, and associated physical, chemical and biological processes in renovating the applied effluent.

2:00 pm Virus Consideration in Land Disposal of Sewage Effluents and Sludge. Flora Mae Wellings, Epidemiology Research Center, Department of Health and Rehabilitative Services, State of Florida, Tampa, Florida 33614. As populations increase, disposal of man's biological wastes poses increasing threats to man's health through contamination of potable water sources with chemicals and pathogenic organisms. This presentation is addressed to the latter and more specifically, the virus problem. Data accrued in laboratories and in the field related to virus survival in the terrestrial environment is reviewed.

2:20 pm Effluent Irrigation as a Physiochemical Hydrodynamic Problem. Allen R. Overman, University of Florida, Gainesville, Florida 32611. Irrigation of cropland with municipal effluent is presently being practiced on a limited scale. Studies have shown that a number of physical, chemical and biological processes occur within the soil-water-plant system. A mathematical framework is discussed for modeling of these processes.

2:40 pm Guidelines for the State of Florida for Land Dispersal of Secondary Municipal Effluents. J. M. Thabaraj, Department of Pollution Control, State of Florida, Tallahassee, Florida 32301. The regulatory aspects of land dispersal of secondary effluents will be discussed with particular reference to the following: (1) Department of Pollution Control's objectives; (2) present treatment standards; (3) Disinfection control and public health considerations; (4) irrigation design; (5) buffer zone requirements; and (6) monitoring requirements.

3:00 pm An Overview of Region IV's Wastewater Treatment Disposal Systems, Using Land Application Through Spray Irrigation Systems. Russ Wright, Environmental Protection Agency, 1421 Peachtree Street, Atlanta, Georgia, 30309. Land application technique is one of two types with respect to discharge. One type involves collection of waste water in underdrain systems where these systems discharge to navigable waters and then must meet the treatment and discharge criteria. The other type of land application techniques involves percolation of waste water through the soil until it becomes part of the permanent aquifer. Land application and land utilization are the two major wastewater management techniques that do not result in point source discharge. Groundwater criteria reflect a level of groundwater protection desired. The criteria are geared to making land application technologically and economically feasible while protecting the groundwater from permanent contamination or costly renovation.

BIOLOGICAL SCIENCE SECTION

Friday 9:15 am Room Science 124

ZOOLOGY

Reinhard A. Schumperli, University of South Florida, presiding

9:15 am BS-1 The Quantitative Distribution of Low Energy Beach Meiofauna of Northwest Florida. J. Kevin Shaw, Univ. of West Florida. A quantitative study of low energy beach meiofauna was conducted at two sites within the Gulf Islands National Seashore, Pensacola, Florida, during the summer, 1974. The abundance of meiofauna ranged from 6.0 to 1002.5 per 10 cm^2 at site 1 (Big Sabine) and 13.5 to 603.5 per 10 cm^2 at site 2 (Big Lagoon) over the three month sampling period. Special consideration was given to the Gastrotricha, noting their vertical and horizontal patterns within each beach.

9:30 am BS-2 Chelonia mydas Nesting on Merritt Island, Florida.* L. M. Ehrhart, Florida Technological Univ.--All previous records of nesting emergences of Atlantic green turtles (Chelonia mydas mydas) in the US are from Hutchinson Island, Martin Co., and Indian River Co., Florida. This paper reports emergences of single green turtles on beaches of the Merritt Island National Wildlife Refuge, Brevard Co., Florida, on July 3, 1973, and July 8 and 23, 1974. This locality is approximately 160 km north of the former northernmost record in Florida, and constitutes the northernmost location of green turtle nesting in the western hemisphere. Mean carapace length (over curvature) of the three specimens was 106.2 cm (100.7-111.1); mean plastron length was 82.5 cm (78.7-85.1). Two of the turtles were weighed (125 kg and 138 kg) and all three were tagged and photographed.

*Research supported by grant NGR 10-019-004 from the National Aeronautics and Space Administration and carried out in cooperation with the Merritt Island NWR staff.

9:45 am BS-3 Observations of the Euryalous Ophiuroid, Astrophyton Muricatum Using the Hydrolab Saturation Facility at Freeport, Grand Bahama Island[1], Thomas S. Hopkins and Deborah Rieck Blizzard, Univ. of West Florida. Through several Hydrolab missions we have been able to document the nocturnal activities of Astrophyton. We have determined that Astrophyton exhibits remarkable fidelity in its nocturnal movement from its place of hiding to its roost and return. Using a simple tagging procedure we have calculated that the average distance traveled was 70.6 cm. (n=35) from hiding place to feeding position. Whereas the larger animals, disc diameter 2 cm or greater, migrate in apparent response to light, the smaller, mottled forms spend their daylight hours curled up in the octocorallian, Pterogorgia. These forms prefer Pterogorgia as a substrate almost to the total exclusion of any other substrate. Furthermore, a single Pterogorgia colony may support as many as 4-5 small mottled individuals. Movement from hiding began at 2020 local time (July) in conjunction with darkness, and they return to their burrows after about 9-10 hours of feeding. This continues to be apparent response to light.

[1] Supported by Manned Undersea Activity Office (Must), NOAA.

10:00 am Room Science 124

Business Meeting of the Biological Sciences Section

Sneed B. Collard, University of West Florida, presiding

10:30 am COFFEE BREAK

10:45 am BS-4 Aggregation and Trail-following in Juvenile Bursatella (Gastropoda: Anaspidea). R. L. TURNER, E. F. LOWE, Univ. of So. Fla. -- Subtidal aggregations of juvenile Bursatella leachii pleii occurred in January 1974 in Pass-a-Grille Channel (27° 39' N; 82° 45' W). Trails of juveniles oriented perpendicularly to the wavefront led from deeper water to near-shore, grass-free areas, where aggregations of up to $6900/m^2$ formed. Additional trails led from the aggregations to the shore, where wave-action stranded the juveniles at densities up to $24,000/m^2$. Juveniles were very small compared to the few adults present (1-22 mg vs. 200-600 mg dry body-wall wt.). Whereas adults had discrete gonads and gonadal indices of 2-16% (gonad wt. X 100/body-wall wt.), most juveniles had diffuse gonadal tissue insufficient for determination of an index. The guts of most specimens were filled with sand. We believe that the size of the aggregations is due to an unusually successful settlement of larvae. The aggregations probably result from normal responses to physical conditions and Bursatella mucous trails, but the aggregations per se probably serve no reproductive, trophic, or protective function.

11:00 am BS-5 Laboratory Maintainance of Luidia clathrata on a Controlled Diet--P.F. Dehn, J. M. Lawrence, Univ. So. Fla.-- Luidia were collected in September, 1974, when no gonads were present and fed either cat or dog food in a gelatin mix or whole Donax. Animals were examined in December and gonads had developed, but whether due to the nutrient source or body reserves is not known. The development was less than that observed in December field animals. All diets maintained the animals' weight. The cat food was used most efficiently and Donax was used least efficiently by the animals. The digestive gland index decreased slightly in the laboratory animals. Despite the weight maintainance there was a slight decrease in the Radius.

11:15 am BS-6 Growth of tropical Red Sea echinoids* J. Lawrence, Univ. So. Fla.--Juvenile echinoids were collected in 1-2 m of water under pebbles and in cracks of the substratum at Eilat, Israel (29°33' N, 34°55' E) in late October, 1969. Animals were maintained through April, 1970, in aquaria with running sea water at environmental temperatures and allowed to feed on food from the field (detritus, diatoms, filamentous algae). Tripneustes gratilla grew from 0.237 to 20.5 g wet wt and 8.8 to 37.9 mm HD; Echinometra mathaei grew from 0.117 to 1.176 g wet wt and 6.2 to 12.5 mm HD; Echinothrix calamaris grew from 2.006 g wet wt to 13.9 g wet wt and 16.6 to 28.8 mm HD; and Diadema setosum grew from 0.142 to 4.23 g wet wt and 5.4 to 18.3 mm HD.

*Work done at the Heinz Steinitz Marine Biological Laboratory. Supported by the Hebrew University of Jerusalem.

11:30 am BS-7 A Preliminary Study On The Spider Crab Mithrax Spinosissimus J. A. BOHNSACK, Univ. of Miami. Mithrax spinosissimus was studied on the Lower Florida Keys and found to be common in certain man-made environments. Average size, weight, and numbers were determined in the study area. Only crabs larger than 6 cm carapace diameter were found in quantity. The abundance tends to increase with the number and size of holes, caves, and crevices in the substrate. Tagging returns indicate an 18 month period between molts for adults. Males are strongly territorial and demonstrate a marked increase in claw size near 8 cm carapace diameter. Commercial exploitation does not appear sustainable at this time. Claw removal and release is not recommended for commercial use. Loss of one claw did not significantly affect survival. Approximately 5 to 10 percent of the population examined were missing claws and 15 to 20 percent were missing at least one walking leg.

11:45 am BS-8 Competing Environmental Influences on the Vertical Migratory Behavior of the Water Flea. LINDA MERRYMAN, Florida Institute of Technology.--Light influences the vertical migratory behavior of the water flea Ceriodaphnia by eliciting movement toward the light source upon exposure to wavelengths near the red end of the spectrum and away from it by wavelengths near the violet end. The water flea is known to swim upward during the night and downward during the day. The different spectra of light may trigger this behavior, which is related to feeding, escaping, mating, or territoriality. Ceriodaphnia were subjected to a temperature range between 15.5 and 43.5°C, O_2 range between 7 and 18 ppm, and pH range between 5 and 10.1, the levels in nature being in the middle of each range. Experimentally, over this wide temperature range, light generally dominated in affecting migratory behavior while toward the far ends of physiological tolerance, O_2 and pH generally dominated over the influence of light. These environmental influences may interact to control daily and seasonal behavior in the water flea.

Friday 12:50 pm Collegiate Room, Cafeteria

Annual Business Meeting of the Florida Academy of Sciences

Robert W. Long, University of South Florida, presiding

Friday 1:30 pm Room Science 137

SYMPOSIUM - LANDSPREADING OF SECONDARY EFFLUENTS

Rudy J. Wodzinski, Florida Technological University, presiding

3:30 pm COFFEE BREAK

3:45 pm BS-9 Macroinvertebrates of the Navarre Pass, Florida Area.* by J.T. Winstead and V. Mitchell. University of West Florida. A baseline study of macroinvertebrates in the Navarre Pass, Florida area was attempted in the summer of 1974 before the construction of a proposed pass across Santa Rosa Island. Benthic, epibenthic and shoreline areas were sampled. Sixty five benthic samples from thirteen stations were taken with a diver operated coring device. Epibenthic samples were taken with a one meter Otter Trawl while a ten meter sein was employed to sample shoreline areas. Results showed polychaete worms, especially Loimia viridis, comprised the majority of organisms with mollusks second and crustaceans third. Benthic biomass ranged from 260mg at station one to 4755mg at station ten. The study should permit a follow up of assessment of the effects, if any, the completed pass will have upon the macroinvertebrate fauna of the area.

*Research supported by NSF grant #021302033

4:00 pm BS-10 **Madreporarian Corals of the Florida Keys---William Trantham, Florida Keys Community College---This paper will describe the collection, preservation for museum and classroom study as well as the maintenance of living coral in the aquarium for laboratory studies.**

Research Funded by Federal Grant No. 2514

4:15 pm BS-11 Oogenesis in Diplectrum pacificum (Pisces; Serranidae) by Stephen A. Bortone, Faculty of Biology, University of West Florida. Histological procedures were utilized to examine oocyte development in gonads of the synchronous hermaphrodite Diplectrum pacificum from Panama. Examination indicates that all stages of oocytes (i.e., oogonia, chromatin nucleus, perinucleoli, yolk vesicle, primary, secondary and tertiary yolk stages, migratory nucleus, mature, and atretic stages) are present in all adult specimens. Oocyte development is territorial defined as areas of the gonad are in a specific state of oogenesis. General morphology of oocyte stages agree with literature accounts of closely related fish species. In particular, observations on follicle development suggest a specific reabsorbing function in atretic eggs. In comparison several differences are noted between D. pacificum and other species for which oogenesis has been described.

4:30 pm BS-12 Myctophid fishes from the Florida Current and the northwestern Sargassa Sea. Philip Steele*, S. B. Collard, A. W. Blizzard, University of West Florida. Myctophid fishes were collected using 3-m Isaacs-Kidd Midwater Trawl (IKMT) and 1-m neuston nets, at depths of 0-600m, in an area from 32°5' to 29°35'N. Lat., and 76°10' to 78°8' W. Long., on Cruise 18-72 of the R/V Eastward. From 128 hauls, 16 genera, 56 species and 3,478 specimens of lanternfishes were identified. Bathymetric and geographic distributions observed are discussed with respect to accounts in the literature. Twenty-four species were found at five or more stations, and accounted for 95 per cent of the catch. Notolychnus valdivae, Diogenichthys atlanticus and Lepidophanes gaussi comprised 45 per cent of the number of individuals caught. Lepidophanes guentheri and Hygophum benoiti appear to exceed the boundaries normally set for them. Support from UNOLS, Duke University, the UWF Research Council and the Ford Foundation is acknowledged.

4:45 pm BS-13 Structural Attributes of Scrub Communities in Relation to Spatial Distribution and Competition Among Small Mammals--I. JACK STOUT, Florida Technological Univ.--This report provided data on the question of how scrub community structure may relate to resource division, habitat selection, and species diversity of small mammals. Three study areas on the campus of Florida Technological University were live-trapped for 14 months. Numerically the dominant small mammals were Peromyscus floridanus, P. gossypinus, and Sigmodon hispidus. The diverse niche exploitation strategies of these mammals provided an opportunity to study the relationship between capture success and structural attributes of the vegetal cover. Number and diversity of small mammal captures were examined in relation to plant species diversity, foliage-height diversity, diversity within particular layers of the scrub, and density and diversity of specific plant groups, e.g., oaks. Consideration was given to the question of how vertical subdivision of habitat among small mammals might compare and contrast with use of space by breeding land birds and lizards.

7:00 pm Collegiate Room, Cafeteria

Annual Banquet of the Academy

Friday 10:45 am Room Science 107

BOTANY, MICROBIOLOGY, and REMOTE SENSING

Janice O. Tsokos, University of South Florida, presiding

10:45 am BS-14 Phytoplankton Indicators of a South Florida Waterway System. L. J. GREENFIELD, University of Miami. -- This paper will describe the application of the Palmer[1] method of "indicator organisms" and the Williams [2,3] method of "community diversity" to the Coral Gables Waterway. The waterway is subject to run off as a potential pollutant and is also under the influence of tidal activity. A salt dam is located about 4 miles upstream. From Jan. to Apr., 1974 samplings along the waterway showed indicator organisms to be similar per station for the whole period and a decrease in organic enrichment from salt dam to bay. Only 4 genera: Oscillatoria (blue-green), Wavicula (diatom), Chlorella, and Ankistrodosmis (green algae) had a significant level (index value). Complicating the system was a bloom of the marine diatom Chaetoceros not indicating other than season. Diversity indices show periodic fluxes due to tidal changes. Other amonalies can be explained by dynamics influenced by changes in the shape of the waterway (widening and shallowing). Data were compiled by students working independently under guidance by staff. [1]C. M. Palmer, J. Phycology 5, 78, 1969. [2]L. G. Williams, Ecology, 45, 809, 1970. [3]L. G. Williams, Ecology 53, 1038, 1972

11:00 am BS-15 Observations on the fouling community in the Indian River Region of Florida. D. H. Mook, Harbor Branch Foundation, Fort Pierce, Florida.-- Settlement of fouling organisms and the development of the fouling community in the Indian River are being studied. Frequencies of occurrences of various fouling organisms on artificial plates will be discussed.

11:15 am BS-16 Some Current Ecological Aspects of Melaleuca quinquenervia (Cav.) Blake in Southern Florida. Taylor R. Alexander, Ronald H. Hofstetter, Department of Biology, University of Miami. Melaleuca (cajeput), introduced into southern Florida in the early 1900's, is undergoing a population explosion. Native plant species in brackish and freshwater wetlands and on uplands are being displaced by this species. Evidence of this and data on density, biomass and reproductive capacity will be presented.

11:30 am BS-17 Changes in Sawgrass Communities in Southern Florida* Ronald H. Hofstetter, Frances Parsons, Department of Biology, University of Miami. Sawgrass, Cladium jamaicense Crantz, once the dominant plant of the Everglades, has decreased in stature and distribution during the last several decades. Since the early 1970's annually increasing amounts of decadent sawgrass have appeared primarily within the dense stands of sawgrass. The role of changes in hydroperiod, excessively hot and frequent fires and an apparent insect threat to this plant species will be discussed.

*Research supported by Department of Interior contract NPS 14-10-9-900-355

11:45 am BS-18 An Ecological Consideration of Caloric Values of Some Everglades Plants. F. Parsons, University of Miami. Caloric value and biomass of plants in the sawgrass and Spartina wetlands and on abandoned farmland are presented.

Friday, 12:50 pm Collegiate Room, Cafeteria
Annual Business Meeting of the Florida Academy of Sciences
Robert W. Long, University of South Florida, presiding

Friday 1:30 pm Room Science 137
SYMPOSIUM - LANDSPREADING OF SECONDARY EFFLUENTS
Rudy J. Wodzinski, Florida Technological University, presiding

3:30 pm COFFEE BREAK

Friday 3:45 pm Room Science 107
BOTANY, MICROBIOLOGY, AND REMOTE SENSING (Cont'd)
Janice O. Tsokos, University of South Florida, presiding

3:45 pm BS-19 An analysis of variation in Quercus chapmanii - James E. Peppleton - University of South Florida. A morphological and chromatographic analysis of natural populations of Quercus chapmanii was undertaken in order to define the inter- and intropopulational variation and to provide explanations for the variation patterns observed. Associated species of Quercus (Quercus virginiana var. maritima and Quercus stellata var. margaretta) were also collected and analyzed to see if they exhibited similar patterns of variation and to see if complex hybridization among closely related species resulted in the variation observed. The results of the study showed that chemical investigations coupled with classical morphological studies offer a means to account for the often complex variation characteristic of species of Quercus and may be of use in elucidating relationships within the genus.

4:00 pm BS-20 A Floristic Assessment of Mound Key. **S. D. TODD, University of South** Florida. This report presents quantitative and qualitative data on the vegetation of Mound Key, Lee Co., in Estero Bay, 15 miles south of Fort Myers. The 125 acre island, composed entirely of shell and sand, has four principal communities: hammock, manthorn scrub, and black mangrove. The flora consists of 118 species in 96 genera and 58 families. Of these, 90% have tropical affinities and 10% are nontropical in origin. Of the total flora, 12% are introduced. Notable species are Celtis iguanaea and C. pallida, both considered uncommon in tropical Florida. The dominant species were determined by quadrat studies to be Avicennia germinans, Bursera simaruba, Eugenia axillaris, Forestiera segregata, Mastichodendron foetidissimum, and Opuntia stricta. This differs significantly from the pine flatwoods and xeric-oak associations found on the nearby mainland. Also there has been much replacement of the natural vegetation by Schinus and Melaleuca. The differences in floristic composition are attributed to the harsh soil conditions and to the buffering effect of the surrounding waters.

4:15 pm BS-21 Humbug Biology? Three Experiments with High Frequency Electric Current in Citrus Seedlings G.J. EDWARDS, Univ. of Florida, AREC--LA.--When bipolar electric current of the frequency of 160,000 CPS at 160 volts peak to peak is used on citrus seedlings, no effect was noticed in their growth. When only the negative portion of the sine wave was used, the trees wilted and died back to 6-8 inches of the soil line.

4:30 pm BS-22 Bacterial Edge Effect in a Salt Marsh* M. A. Hood and J. G. Gosselink, Univ. West Florida and Louisiana State Univ.--Sediment samples were collected in a Spartina alternaflora marsh and the following parameters were measured: organic content, bacterial biomass, species number, diversity index, and pigmented colony types. The transect represented four sub-environments: 1) submerged sediment from the bayou, mid-stream, 2) midway between mid-stream and edge, side-stream, 3) emergent sediment at the marsh edge, and 4) emergent sediment within the marsh proper. Organic content was highest within the marsh proper, intermediate at the marsh edge, and lowest at the mid-stream and side-stream. Total heterotrophic aerobic bacteria were highest at the edge, intermediate in the marsh, and lowest at mid-stream and side-stream. The number of different colony units and the diversity index were highest at the edge, intermediate at the side-stream and marsh, and lowest at mid-stream. The ratio of pigmented to total colony units from highest to lowest was mid-stream, side-stream, marsh, and edge. The data suggest that the water/land interface represents the most bacteriologically active zone. *Research supported by NOAA, L.S.U. Sea Grant

4:45 pm BS-23 Protease-Mediated Posttranslational Control of Sporulation in Allomyces arbuscula T.D. Noland, T.W. Seale, Florida St. Univ. The control of developmental processes is currently viewed in terms of differential gene expression. Although posttranslational proteolytic modification is a common phenomenon in eucaryotic and procaryotic systems, their functions as mediators of cellular differentiation remain obscure. During mitospore formation in A. arbuscula the extracellular proteolytic enzyme activity increases with time following induction. Analysis of the culture filtrate reveals the presence of a new enzyme species, distinguishable from those produced vegetatively. Time course studies support the premise that the increase in proteolytic activity corresponds to the development and liberation of the mitospores. The addition of cycloheximide effectively blocks sporulation, but fails to inhibit protease excretion. Liberation of the spores is dependent upon the hydrolysis of the sporangial plug, a glycoprotein-rich structure located in the exit papillum. Scanning electron microscopy is employed in order to visualize the role of the plug as a biological substrate for the protease.

5:00 pm BS-24 The use of aerial imagery in documentation of submerged estuarine features* C. Down, Environmental Engineering, Brevard County Health Department. This paper discusses parameters used in obtaining the aerial photos; considers the ground truth data obtained and discusses the significance of the above-method as means of documentation in shallow estuarine areas. The area under study is located in the Banana River of Brevard County. This shallow non-tidal estuary supports extensive grassbeds, seaweeds and associated invertebrates; however, the above study only considers the primary production parameters.

*Study a joint venture of NASA ERTS Program and Brevard County Health Department.

7:00 pm Collegiate Room, Cafeteria

Annual Banquet of the Academy

Saturday 9:00 am Room Science 124

PHYSIOLOGY, BIOCHEMISTRY, AND PATHOLOGY

Stephen A. Bortone, University of West Florida, presiding

9:00 am BS-25 Hormonal Control of Molting in Ovigerous Palaemonetes pugio* K. RANGA RAO, MAURICE J. INKEL JR., University of West Florida. Although it is known that ovigerous crustaceans delay ecdysis, the mechanisms of control remain to be investigated. Experiments on ovigerous grass shrimp revealed the following. The shrimps initiated proecdysis prior to hatching of eggs. Neosetogenesis did not proceed until after hatching. Neither removal of the attached eggs nor bilateral ablation of eyestalks caused precocious initiation and completion of proecdysial events. However, injection of 0.1 or 0.2ug of 20-hydroxyecdysone induced precocious initiation of setogenesis and ecdysis. Several of the injected animals molted precociously, casting exuvia with eggs attached. The hormonal interactions in the control of molting and reproduction will be discussed.

*supported by Grant GY-11132 from NSF.

9:15 am BS-26 Binocular and Monocular Visual Fields of Butterfly Interneurons.* REINHARD A. SCHUEMPERLT, Univ. of South Florida.--A method of recording single unit activity in the butterfly protocerebrum was used, which allows binocular stimulation of the intact animal with black and white or color stimuli and immediate display of the visual field of the neuron. All monocular units showed ipsilateral visual fields ranging in size from a few degrees to >70°. Binocular units showed symmetrical or ipsilaterally dominated input. In most cases the fields corresponding to the two eyes were separated or adjacent with no overlapping areas. In one case an excitatory input from the ipsilateral and an inhibitory input from the contralateral eye was demonstrated. Most visual fields decreased in size with increasing light adaptation and some showed color-specific changes in field-size and location. *Research supported by the Swiss National Science Foundation.

9:30 am BS-27 Effects of Osmotic Stress on Levels of Blood Amino Acids in a Euryhalinic Teleost. B.F. BRANDON, G.M. COHEN, Florida Institute of Technology.-The hairy blenny Labrisomus nunchipinis is a euryhalinic teleost that commonly inhabits the coastal and brackish waters of Florida. We have examined the levels of presumed amino acids (ninhydrin-positive substances) during periods of osmotic stress. The blennies were allowed to acclimate to 100%, 50%, and 25% sea water before being stressed in increased or decreased salinities. Blood samples were drawn from the dorsal blood sinus of the gills of anaesthesized fish at 1,3, 5, and 24 hours. In the blenny normal blood levels of amino acids are 4 mg/ml. Transfer from 100% to 25% sea water resulted in a fall to 1 mg/ml before rising to normal within 3 hours; converesly, transfer from 25% to 100% sea water resulted in a transient rise to 19 mg/ml before dropping down to normal. Thus although the blenny shares with several aquatic invertebrates and vertebrates the ability to tolerate osmotic stresses by adjusting the levels of amino acids, it differs by the transience of the response.

9:45 am BS-28 Isolation and Characterization of Gonadotrophic Factors from the Pituitary of the Grey Mullet, Mugil cephalus. R. VOMACKA, Department of Biology, University of South Florida. The preliminary isolation of gonadotrophin from M. cephalus was accomplished via ethanolic extraction and chromatographic separation of lyophilized pituitaries. Radioimmunoassay data indicate the presence of three peaks which possess biological activity. Preliminary bioassay data indicate that all three peaks are biologically active. SDS electrophoresis yielded molecular weight estimates for the active fractions of 15,000, 19,000 and 27,000.

10:00 am BS-29 Diurnal Rhythm of Gill Na-K-ATPase in the Euryhaline Cyprinodont, Fundulus Grandis. R. Larson, Department of Biology, University of South Florida. A distinct diurnal variation of gill Na-K-ATPase activity was found in F. Grandis maintained in SW on a 16HL/8HD photoperiod. Two peaks of enzyme activity occur at six and fourteen hours after the onset of light. A diurnal rhythm of plasma cortisol has been reported in F. grandis with peaks occurring at one and nine hours after the onset of light. As the lag period suggests, peaks of gill Na-K-ATPase activity are a direct result of elevated plasma cortisol levels via protein synthesis.

10:15 am COFFEE BREAK

10:30 am BS-30 A Comparative Study of Some Abnormal Erythrocyte Membranes. C. LUER, J. R. LINTON and K.-P. WONG, University of South Florida, Tampa.

Membrane proteins from normal and various diseased erythrocytes were studied to see if any differences exist which may correlate with the observed functional abnormality. Analyses include determination of protein secondary structure by circular dichroism and of polypeptide components by SDS-polyacrylamide gel electrophoresis. Observed differences indicate a reduction in α-helical content in the abnormal membranes with a proportional increase in unordered structure, and an apparent absence of several species of polypeptide chains which are obviously present in the normal erythrocyte membranes.

10:45 am BS-31 A Model for the Analysis of Cell Radiosensitivity during the Cell Cycle. JANICE O. TSOKOS. Univ. of So. Florida. Variation in cell radiosensitivity is approximated by a compartmental model dividing the cell cycle into two phases, a sensitive phase in which damage of one target kills a cell, and a resistant phase in which cells have a high target number, n, and all n targets must be damaged to kill the cell. A dose of D_o rads accomplishes as many hits as targets. The time spent in the sensitive and resistant phases and rates of cycling between them vary; e.g., the radiosensitive part of the cell cycle probably ranges between 5 and 30%. Thus the parameters may be treated as random variables with specified probability distributions. The behavior of sensitive cells, S(t), and resistant cells, R(t) as functions of number of D_o's administered/cycle over a complete 48 hr. cycle will be shown, in addition to the average behavior of S(t) and R(t) under random influence of the sensitive, S_o, and resistant, R_o, proportions of the cell population when treatment begins. Comparison of the statistical and deterministic trajectories of S(t) and R(t) will also be given.

11:00 am BS-32 Current and Potential Dangers of Chlorine and Chlorinated Compounds in the Aqueous Environment. B.M. KATZ, G. M. COHEN, Florida Inst. Techn. -- Chlorination has been employed as a disinfectant in drinking water and secondary sewage effluents for decades without recognizable detriment to human or environmental health. Because the beneficial actions of chlorination greatly outweighed the dangers, the potential hazards of this highly reactive halide combining with organic substances have been overlooked or disregarded. Due to both the discharge of increased quantities of chlorine and the detection of stable organochlorine compounds in natural waters and secondary effluents, the search for their actions on aquatic life has accelerated. We have compared the toxicity of free chlorine to the toxicity before and after chlorination of representative classes of compounds present in sewage, industrial wastes and agricultural runoffs. Our study includes examples of the following: amino acids, proteins, carbohydrages, phenolics, nucleic acids, lipids, tannins, pesticides, xanthines and detergents. Depending on the compound, its combination with chlorine can potentiate, reduce, or not affect acute toxicity. The minnow Gambusia affinis was used to test toxicity.

11:15am BS-33 The Toxicity of Chlorine on the Minnow Gambusia affinis. B.M.KATZ, G.M. COHEN. Florida Institute of Technology.--Fish differ markedly in their tolerence to lethal levels of chlorine. Some game fish are killed by chlorine concentrations as low as 1 ppb while other fish such as minnows are several hundred fold more resistant. To date neither the locus nor the mechanism of chlorine toxicity has been established. We performed enzymatic, physiological and ultrastructural studies on the tissues of intoxicated minnows. We were unable to detect inhibition of enzymatic activity in gill malic dehydrogenase, gill and liver ATPases or brain cholinesterase. Liver ultrastructure was unaffected. In addition chlorine intoxication did not modify swimming movements, increase or reduce O_2 consumption, or change gill color. Because of the absence of definable actions on these systems, we are exploring the possibility that chlorine may form toxic stable compounds with ammonia and other nitrogenous wastes in the gills and kidneys.

EARTH AND PLANETARY SCIENCES SECTION

Thursday 1:00 pm Room Science 137

Session A

Patrick J. Gleason, Florida Flood Control District, presiding

1:00 pm EPS-1 Preliminary Geochronology of the Safety Valve Formation J.B. PLESCIA and J.J. STIPP, Geology Dept., University of Miami, Coral Gables, Florida 33124 -- The Safety Valve is a complex carbonate tidal bar belt extending approx. 10 miles southward from Key Biscayne to Soldier Key in Biscayne Bay, Florida. The belt is composed of about 10 individual east-west trending bars separated by tidal channels. The bars are approx. 2 to 3 miles in length along the E-W axis and 0.5 miles in width. Sediment thickness varies from 4-5 meters in the north to 1 meter at the southern end. C-14 dates indicate that the northern section began forming about 3600 years B.P. about the time Biscayne Bay was reflooded by the rise of sea level. The area just north of Soldier Key began forming about 1800 years B.P. Radiocarbon ages and geomorphological evidence indicates a southerly growth as well as a lateral one through time.

1:20 pm EPS-2 A Brackish Water Carbonate in the Central Valley of Florida T.M. Scott, Bureau of Geology, 903 West Tennessee St., Tallahassee, Fla. 32304.
--The Apopka Limestone is an informal name applied to a calcareous unit found in the Central Valley of Florida. The Apopka Limestone is predominantly a biomicrite with clay and sand stringers. Areally, the unit has been traced to the Orange and Lake counties and west through the Lake Harris Cross Valley to within approximately five miles of the Crystal River Limestone outcrop in Lake and Sumter counties. Outcrops are generally located in canals and excavations.

Stratigraphically, the unit is overlain by fresh water peat containing numerous gastropods. It is underlain by sands, clay and silt which overlie sandy, silty shell beds immediately above the Hawthorn Formation. Laterally, the Apopka Limestone appears to interfinger with the sands of the Mt. Dora Ridge and Sumter-Lake Uplands.

The Apopka Limestone contains a prolific fauna consisting of a relatively few genera of mollusks, foraminifera, and ostracods. This probably indicates a rather unique environment.

Currently, the Apopka Limestone is believed to be of Pliocene to Pleistocene Age based on the relationships of the associated sea level stands during which it could have been deposited.

1:40 pm EPS-3 The Miocene of DeSoto County, Fla.- Peter MacGill, Bureau of Geology, 903 West Tennessee St., Tallahassee, Florida 32304 - DeSoto County occupies a unique position in the state where the thick section of Miocene and younger sediments in southern Florida merge with the relatively thin section occupying the same interval of time in northern Peninsular Florida. Its uniqueness is governed by the fact that Miocene and younger sediments in DeSoto County are represented by a continuous depositional episode that rarely reveals distinctive lithologic units or erosional cycles. Being protected from deposition by marine agencies on both sides, a constructive Miocene delta deposited, reworked and redistributed the sediments so common to the Miocene in Peninsular Florida - sand, clay and phosphorite. Carbonates were deposited in distal portions of this delta as it prograded into southern Florida. Variations in the chemical quality of the water and the migration of suitable substrates caused mollusks and other organisms to move laterally as clastic deposition continued in adjacent areas. Terrestrial, estuarine and shallow marine environments existed side by side and interfingered with each other. Slight fluctuations in sea level in this low coastal region caused depositional environments to change dramatically thereby masking their original character.

2:00 pm EPS-4 Stromatolite Identification by Sediment Fabric, K.M. Balshaw, Geology Department, University of South Florida, Tampa, Florida 33620.
--Algal mats exist in modern carbonate and quartzose sediments. They have been recognized as stromatolites in fine grained carbonate rocks and are used in interpreting environments of deposition. Due to diagenetic destruction, stromatolite structures are rarely recognized in sand-sized, partially quartzose, sediments. Petrographic analysis of modern quartzose algal-mats, psammiphyte zones, and non-algal strata from the beaches of Anclote Key, Fla., and algal-mats in carbonate sand beaches of Bermuda suggest that grain orientation may be used to recognize algal-mat deposits in sandstones. By use of X^2 tests, it is shown that there are significant differences in orientation of sand grains trapped in algal-mats as compared to those in non-algal and psammiphyte strate.

2:20 pm EPS-5 Sedimentary Structures and Animal-sediment Relationships, Old Tampa Bay, Florida, F. W. Ross and T. V. Mayou, University of South Florida, Dept. of Geology, Tampa, Florida 33620.

In order to describe potentially preservable physical and biogenic structures produced in Old Tampa Bay, the surficial subtidal sediments were studied in terms of: 1) textural type and distribution of sediment being deposited, 2) characteristic sedimentary structures and their modes of origin, 3) distribution of geologically significant macrofauna, and 4) animal-sediment relationships and effects of organisms upon sediments, including intensity of bioturbation. These sedimentary characteristics are potentially useful for deciphering estuarine depositional environments in the rock record. Three laterally gradational sedimentary facies defined on both physical and biologic parameters were distinguished in Old Tampa Bay: 1) Clean Sand Facies, 2) Muddy Sand Facies, and 3) Mud Facies.

2:40 pm EPS-6 Substrate Mapping by Sidescan Sonar R.W. PERMENTER, W.L. Stubblefield, D.J.P. Swift, Atlantic Oceanographic & Meteorological Laboratories, Marine Geology & Geophysics Laboratory, 15 Rickenbacker Causeway, Miami, Florida 33149.
--Sonographs (sidescan sonar records) of the continental shelf floor off New York were used to determine the texture of bottom sediment. Nine sites in the New York Bight apex each approximately 150 by 300 m, were selected for study. The sites picked were either characteristic of important bottom sediment types, or straddled facies boundaries. Sonographs were made of each study area and grab samples collected every 15 m along a transect down the center of each area. Raydist navigation was used. Comparison of sonographs and grab sample data indicates that in some cases, changes in bottom texture finer than the standard Wentworth size classes may be resolved on the sonograph as variations in the intensity and character of the record. In areas where texture changes abruptly, the facies boundary is

readily discernable on the sonograph. Such sidescan sonar records calibrated by grab samples are efficient tools for quickly mapping bottom sediment textures over large areas of the sea floor.

3:00 pm COFFEE BREAK

3:20 pm EPS-7 Geothermal Gradient Measurements in Florida Boreholes D. L. SMITH and W. R. FULLER, Dept. of Geology, University of Florida, Gainesville, Florida 32611.

Measurements of the geothermal gradient in six undisturbed deep boreholes in Florida represent the first phase of an investigation into the thermal nature of Florida and provide a basis for preliminary estimates of surficial heat flow. Geothermal gradients were determined with a thermistor probe and electronic bridge assembly, yielding uncorrected values from 38.2°C/km in a 335 m deep hole in Santa Rosa County to 12.8°C/km in a 400 m deep hole in Pinellas County. Assumptions of thermal conductivity values for major rock units permit estimates of the geothermal flux that appear to be consistent with known heat flow determinations for the state. In general, low values of heat flow (≤ 1 microcalorie/sec cm^2) are apparently characteristic of Florida.

3:40 pm EPS-8 Heat Budget of Oil Contaminated Sea Ice, CHARLES R. WEIR, 215 Westridge Drive, Tallahassee, Fl 32304.

--One aspect of a major oil spill in the Arctic Ocean is its effect on the ocean's heat budget and the equilibrium ice thickness, possibly causing large scale meteorological and oceanographic effects. Field studies of oil polluted ice were conducted in the Arctic to determine the physical effects of the contamination. Values of albedo, incoming short and long wave radiation, surface temperature, transmitted short wave radiation, relative humidity, and ice ablation rates were determined from an experimental site located off Pt. Barrow, Alaska during June of 1974. These measurements indicate that a contaminated ice field will be destroyed allowing an ice free ocean to absorb a large amount of previously unavailable energy.

4:00 pm EPS-9 The Effect of Steady State Terrestrial Heat Flow on the Gravity Field ROMAN K.C. JOHNS, Florida Institute of Technology, Melbourne, Florida 32901.

--Surface gravimetry has been providing information about the structure and composition of the earth's crust. In this paper the relation between steady state heat flow ($dT/dt = 0$) and gravity anomalies is discussed. It is assumed that the heat flow is generated by the decay of radioactive substances located in the crust.

4:20 pm EPS-10 Bouguer Anomaly Values for Alachua County, Florida, D. L. SMITH and G. J. TAYLOR, Dept. of Geology, University of Florida, Gainesville, Florida 32611.

A detailed gravimetric survey of Alachua County, Florida, consisting of over 250 occupied stations and the establishment of two base stations, reveals Bouguer anomaly values ranging from -17 mgals to +5 mgals and general anomaly patterns consistent with the existing statewide gravity map. Using the simplistic assumption that Bouguer anomalies can be attributed entirely to basement irregularities, a computer model of the sedimentary sequence - crystalline basement interface was calculated with the best solution requiring relief of 0.8 km at a depth of 1.2 km. In addition, Poisson's equations relating gravity fields to magnetic fields were used to compute a pseudo-magnetic field for Alachua County. The calculated magnetic trends compare favorably with those of existing magnetic surveys of the state.

4:40 pm EPS-11 Experience With Continuous Reflection Seismic Profiling In The Florida Marine Environment R. C. Benson, Technos, Inc., P. O. Box 330891, Miami, Florida 33133.

--Continuous Reflection Seismic Profiling or Subbottom Profiling (C. R. S. P.) has proved to be an efficient tool in numerous marine applications.

--The method consists of applying the proper type of CRSP equipment backed up by "bottom truth" core samples. This method is a powerful and economic means of obtaining a large amount of continuous data. 120 miles of CRSP line was run on Lake Okeechobee to determine the volume of bottom muds. A deep offshore sand deposit was located in the Miami area and verified by Vibracore sample. Bottom mud deposits within a Miami marina and adjacent channels were inspected. Depth to limestone bedrock was established in the Key Biscayne area.

5:00 pm EPS-12 Geophysical Methods Used To Locate Solution Holes and Cavities
R. C. Benson, Technos, Inc., P. O. Box 330891, Miami, Florida 33133.
--Solution holes and cavities within a limestone matrix have been a constant problem to the various engineering firms and contractors involved with foundations, roads, etc. Using classic geophysical methods and improved "state of the art" instrumentation, the author has successfully and economically located cavities and solution holes within Florida.
--The methods used on land are: seismic refraction combined with resistivity. Multiple calibration sites are established. Rapid reconnaissance, utilizing resistivity profiling and 3 dimensional mapping, is used to cover the entire site. Subsequent effort is then directed to anomalous structures revealed by resistivity profiling. Detailed seismic and resistivity methods are then utilized. Further work is being conducted with vehicle mounted low frequency electromagnetics.

5:20 pm EPS-13 A Hydrographic Survey in Pensacola Bay H.G. KETCHEN, Dept. of Oceanography Florida State University, Tallahassee, Florida 32306.

A study of the currents and salt balance through a vertical cross section of Pensacola Bay was conducted in an attempt to determine pollutant flushing tendencies in this economically important but highly polluted estuary. The portion of the bay of concern in this study has a maximum depth of 10 to 12 m. and a predominantly diurnal tide with ranges of 0.1 to 0.8 m. Salinity, temperature, dissolved oxygen, and current speed and direction were measured during four separate 24-hour periods in the summer and fall of 1974. Time averaging of the data over a tidal cycle eliminated much of the tidal noise, permitting use of the residual current in evaluating the salt balance and gaining some insight into the predominate circulation patterns in the estuary. Wind stress was found to have an appreciable effect on the bay's circulation, at times causing a complete reversal of the typical gravity current found under no-wind conditions.

5:40 pm EPS-14 Original Research - An Effective Tool in Undergraduate Geoscience Teaching
J.J. STIPP and K.L. ELDRIDGE, Geology Dept., University of Miami, Coral Gables, Florida
-- Radiocarbon dating is the core of a unique one-semester course which involves selected University Geoscience juniors and seniors in the whole process of original research. Each student decides upon a personal 'time' solvable problem to be investigated (under strict supervision). Included is the field investigation and collection, attainment of competence on the necessary advanced instrumentation and chemical techniques, evaluation of results, defence of the interpretation and the writing of a publishable manuscript in the format of the scientific journal chosen. The course has proven extremely effective in accelerating the students appreciation and understanding of classroom memorized scientific principles and methods. Such accomplishment has also produced a very accelerated and visible increase of personal confidence and academic maturity.
Organization and adaptability of the program will be discussed.

7:00 pm SOCIAL HOUR, RAMADA INN

Thursday 1:00 pm Room Science 135

Session B

Edward O'Donnell, presiding

1:00 pm EPS-15 Radiocarbon Dates and Recent Bahamian Sea Level P. CREVELLO, H. BUCHANAN* and J.J. STIPP, Geology Dept., University of Miami, Coral Gables, Florida.
-- Cores of Holocene age were taken in the Fraziers Hog Cay area of the Bahama Bank, for the study of sea level transgression. Petrographic and x-ray analysis of lithified sediments indicate marine origin. C-14 ages were determined on carbonate materials. The data suggests that sea level was rising slowly and sedimentation was restricted by the preexisting topography, at least until 2000 years B.P. The study also reveals the widespread occurrence of subsea cementation in this area.
*Geology Dept., University of West Virginia, Morgantown, West Virginia.

1:20 pm EPS-16 Holocene Sea Level History and Its Relationship to Eolianite Sequences on Haines Cay, (Northern) Berry Islands, Bahamas
D. PASLEY, JR., S. LOCKER, J. STIPP, c/o Geology Dept., Univ. of Miami, Miami, Florida 33124. -- The Berry Islands, represent a complex arrangement of carbonate facies deposited during late Quaternary sea level "highstands" (Pasley, 1974). Haines Cay, a shelf-edge island, consists

of three generations of dune ridges distinguished by differences in topographic setting, diagenetic grade and internal bedding characteristics. Temporal framework provided by C^{14} analyses of bulk samples indicates "early" Holocene sediments (5500-5800 yrs. B.P.) compose the currently eroding shelf-shoreline dunes. Dates from inland-dune sediments range from 2700 yrs. B.P. (Stipp and Eldridge, 1975) to 4100 yrs. B.P. The present-day back beach dune dates 1900 yrs. B.P. Texture and composition differences in sediments from respective dune ridges reflect changes in the shelf sedimentological regime during the Holocene sea transgression.

1:40 pm EPS-17 The Geology of a Central Florida Peat Bog T. M. GURR, R.C. Fountain & Associates, P.O. Box 1858, Winter Haven, Florida 33880. --A large fibrous peat deposit exists in Polk County, Florida, at the eastern edge of the Central Florida Phosphate District. The formation of the carbonaceous deposit is a consequence of numerous geological conditions, the most important of which are the paleoclimate, the recent geomorphology, the Pleistocene sea levels, and the late Cenozoic stratigraphy.

2:00 pm EPS-18 Radiocarbon Dating of the Pot-Belly Statuary of El Salvador and Guatemala H.H. CADWELL, S.H. BOGGS* and J.J. STIPP, Geology Dept., University of Miami, Coral Gables, Florida 33124.
-- Until the 1969 excavation of the Santa Leticia, El Salvador site, there had been no suitable material for radiocarbon dating associated with the unusual, large 'pot-belly' figures of Guatemala and El Salvador. Four charcoal samples recovered beneath the Santa Leticia pot-belly indicate it was ceremonially positioned sometime after 600 B.C.
*Apartado 1600, San Salvador, El Salvador, C.A.

2:20 pm EPS-19 Faunal Analysis and Age of Habitation of the Maximo Park Site, St. Petersburg, Florida M.J. ANDREJKO, R. WILLIAMS* and J.J. STIPP, Geology Dept., University of Miami, Coral Gables, Florida 33124.
-- Marine Molluscan remains recovered from a shell midden complex at the Maximo Park site were compared with representative modern marine fauna of the Boca Ceiga Bay area. This allowed for an attempt at reconstruction of both environmental utilization patterns and ecological conditions for the Archaic Period occupancy of the site. Shell samples gathered for C-14 dating indicate a maximum age range for habitation of 4200-4800 years B.P. Faunal analyses demonstrate that the animal resources near the site today were available at the time of occupation.
*Anthropology Dept., University of South Florida, Tampa, Florida.

2:40 pm EPS-20 Radiocarbon Dating of the Delaney Creek Shell Midden, Tampa, Florida R. CATHCART, R. WILLIAMS* and J.J. STIPP, Geology Dept., University of Miami, Coral Gables, Florida 33124.
-- Charcoal and shell samples recovered from the Delaney Creek excavation produced C-14 ages suggesting habitation over a period of 800 years beginning about 900 B.C. Age discrepancies between material types and some inversions with depth in the shallow site indicate that the site had seen periods of physical disturbance.
*Anthropology Dept., University of South Florida, Tampa, Florida.

3:00 pm COFFEE BREAK

3:20 pm EPS-21 Minerogen Accumulation Rates from the Central Mid-Atlantic Ridge D. GRIGORIEV, K. BOSTROM* and J.J. STIPP, Geology Dept., University of Miami, Coral Gables, Florida 33124.
-- Pelagic oozes in gravity cores from the Central Mid-Atlantic were C-14 dated to determine minerogen (Fe, Mn, Cu, Co, Ba, Ni) accumulation rates at a slow spreading ridge. Accumulation rates are affected by abundant terrigenous sedimentation from both South America and Africa, and by considerable biologic activity. Sedimentation rates of 2.5 to 3 cm/1000 years indicate that the contribution of minerogens from hydrothermal solutions is very small.
*Lulei University, Lulei, Sweden.

3:40 pm EPS-22 Minerogen Enriched Sediments from the East Pacific Rise J.G. HATTNER, K. BOSTROM* and J.J. STIPP, Geology Dept., University of Miami, Coral Gables, Florida.
-- Accumulation rates of minerogen fractions (Fe, Mn, Cu, Co, Ba, Ni) from the East Pacific Rise were determined by C-14 dating of cores to test the idea of mantle degassing at highly active spreading ridges. The area is characterized as a virtual bio-

logic desert with few terrigenous sediments. Sedimentation rates of 2.5 to 5.5 cm per 1000 years indicate minerogen enrichment in nearby sediments. This suggests that hydrothermal solutions act as a major minerogen source only at the East Pacific Rise.
*Lulei University, Lulei, Sweden.

4:00 pm EPS-23 Vertebrate Evidence of a Pleistocene Gulf Coastal Savanna Corridor, S.D. Webb, Florida State Museum, Gainesville, Florida, 32611.
--The rich fossil record of Pleistocene vertebrates in Florida reveals a notable correlation between times of low sea level and phased appearances of exotic species in land sites. The sources of these immigrant taxa are principally semiarid regions in western North Americaand savanna habitats in tropical America. Diagnostic species include such forms as ground squirrels and scrub jays from the west and ground sloths and vampire bats from the south. This eustatically-controlled Gulf Coastal Savanna Corridor also favored spread of North American groups, including sabercats, mastodonts, tapirs, llamas, and peccaries into Central and South America. Evidently the glacial temperature in Florida did not discourage neotropical immigrants.

4:20 pm EPS-24 Stratigraphic Significance of Eupatagus Ingens, L.G. Zachos & G.D. Shaak Florida State Museum, University of Florida, Gainesville, Florida 32611.
Collection of large number of specimens of *Eupatagus clevei* (Cotteau) and *E. ingens* Zachos from the Eocene Ocala Limestone has made possible a reassessment of these species. Comparisons were made with the types of *E. clevei*, *E. ingens*, and *E. grandiflorus*, a synonym of *E. clevei*. The type of *E. clevei* shows a well developed anal fasciole, not previously reported. All specimens without this feature are referred to *E. ingens*. The suite of specimens of *E. ingens* shows measureable phenotypic variation. This species occurs in three vertically successive zones of the Ocala Limestone: basal *Periarchus lyelli* zone; middle *Amusium ocalanum* zone; and upper *Spirulaea vernoni* zone. There is a regular increase in size through time. Petal length-width ratio also increases through time. Petal form changes from evenly lanceolate to oblanceolate in stratigraphically younger specimens.
These data suggest regional correlative value. Morphologically identical specimens from Taylor County, Florida and Panama suggest correlation at the biozone level.

4:40 pm EPS-25 Floods Caused by Heavy Rainfall in Pinellas County, Florida, G.E. SEABURN, U.S. Geological Survey, 500 Zack St., Tampa, Florida 33602.
--Rainfall resulting from a tropical depression averaged over 15 inches and exceeded 20 inches in some places in Pinellas County between June 24 and 28, 1974. The heaviest one-day rainfall, which occurred on June 26, ranged from 4 to 10 inches and averaged about 7 inches at 20 gaging sites. During one 6-hour period on this day, rainfall intensities exceeded 1 inch per hour in St. Petersburg. Extensive flooding occurred in St. Petersburg, Pinellas Park, Largo and Clearwater. Peak discharges on three gaged streams draining urban areas were more than 400 cubic feet per second per square mile and were the largest ever recorded in those areas. Total damages to public and private facilities were estimated at over $20 million. Local flooding was intensified by one or a combination of the following conditions; 1) inadequately designed drainage facilities and low land-surface gradients, 2) reduced channel capacities caused by weeds, debris, and other constrictions, and 3) backwater from high tides and culvert constrictions.

5:00 pm EPS-26 Procedures for Determining Lake Stages and Fluctuation Schedules of Artificially Regulated Lakes. P.M. Dooris and W.D. Courser, Southwest Florida Water Management District, P.O. Box 457, Brooksville, Fla. 33512.
--Approaches are discussed for integrating biological, hydrological and cultural features of lakes into development of stages and fluctuation schedules to avoid stabilization of lake levels which has been known to contribute to accelerated eutrophication.

5:20 pm EPS-27 A Water Demand Model for Central and Southern Florida N. KHANAL, and A. KREITMAN, Central and Southern Florida Flood Control District, P.O. Box V, West Palm Beach, Florida 33402.
--With the increasing responsibility of the role in all aspects of water resources planning and regulatory functions, the need for a planning model to enable estimates of projected municipal water requirements has become evident. This study is an initial effort in developing an socio-economic model of municipal water requirements for Central and Southern Florida cities. The model permits determination of the water requirement for 33 cities, by use of regression functions. The coefficient of determination is 85 percent.

7:00 pm - SOCIAL HOUR, RAMADA INN

Friday 7:40 am Room Science 137

Session A

Patrick J. Gleason, Florida Flood Control District, presiding

7:40 am EPS-28 Film- Tampa Bay Estuarine Hydrology Study.* C. R. GOODWIN, Hydrologist, U.S.G.S., 500 Zack St., Tampa, Florida 33602.
--A 16 mm, color, sound film documents a comprehensive study of the hydrology of Tampa Bay, Florida. Results of the study are being used to evaluate the probable effects of deepening the main ship channel from Tampa to the Gulf. Film segments include problem definition, background, data-collection activities, and initial results of hydrodynamic and water-quality modeling. Highlights are aerial footage of industrial, residential and natural shoreline; details of tide, bathymetric, seismic and water-quality data collection; and time-lapse presentation of graphic, computer-prepared model out-put.
*Supported by Tampa Port Authority and Corps of Engineers.

8:00 am EPS-29 Current Status of Feasibility Studies of Freshwater Storage and Recovery from Saline Zones PAUL M. BEAM, Bureau of Water Resources, Florida Department of Natural Resources, Tallahassee, Florida 32304. -The Florida Department of Natural Resources is presently working on two cooperative feasibility studies -- one with Palm Beach County and the other with the City of St. Petersburg. Both sites have undergone preliminary testing and are currently being readied for long-term testing.

8:20 am EPS-30 Sources and Effects of Saline Water Leakage into the Fresh-Water Aquifers of Lee County, Florida T. M. Missimer, U. S. Geological Survey, 106 Smith Bldg., 2070 Main St., Fort Myers, Florida 33901.
--Ground-water is the principal source of domestic and municipal water supply in Lee County, Florida. Intrusion or leakage of saline water has resulted in deterioration of water quality in the fresh-water aquifers in some areas. Sources of saline water include sea water along the coastal margins and inland tidal water bodies, deep artesian aquifers which underlie the entire county, and shallow artesian and non-artesian aquifers which contain remanent unflushed seawater.

Although the occurrence of saline water is the result of natural factors, the intrusion or leakage of saline water into fresh-water aquifers is primarily related to the effects of man's activities. Included are the effects caused by excessive lowering of ground-water levels by pumping, improper construction of wells or test holes, and the excavation of canals which facilitate inland movement of seawater.

The upper Hawthorn aquifer, consisting predominantly of limestone, is a major source of water supply in the western part of Lee County. This shallow artesian aquifer has been widely affected by both upward leakage of saline water from deep artesian aquifers through uncased borehole sections and downward leakage through corrosion holes in the upper sections of steel casing in areas where saline water occurs at shallow depths. Normal chloride concentration of the water in the upper Hawthorn aquifer ranges from 50 mg/l to 150 mg/l; where leakage has occurred the chloride concentration ranges from 600 mg/l to 10,000 mg/l.

8:40 am EPS-31 South Florida's Water Resource - Use and Management. W.V. STORCH, Director, Resource Planning Department, Central and Southern Florida Flood Control District, West Palm Beach, Florida 33402.
--In south Florida agricultural irrigation accounts for well over half the total water use.Both agricultural and municipal water use demonstrate strongly seasonal characteristics. Over most of the area there is an average annual excess of precipitation over potential evaporation, indicative of water surplus area. However, the surplus is seasonal and out of phase with peak demand. This seasonality of precipitation and demand defines one aspect of the water management task in south Florida; the redistribution of useable water in space and time. Redistribution must recognize the special difficulties and challenges associated with the maintenance of a unique land-water environment - the Everglades - in close juxtaposition with both an important agricultural economy and an expanding urban population. Recent land use and water resources legislation may provide a basis for guiding and informing water management decisions.

9:00 am EPS-32 The Role of the Geologist in Land-Use Planning, S. B. UPCHURCH, Geology Dept., University of South Florida, Tampa, FL 33620.
Cost-effective land-use planning involves early identification of the geologic suitability of land areas for specified uses and controlled development within the constraints imposed by the land. The geologist should be, but often is not, involved in this procedure. This paper develops a sequence for land-use planning and shows

where in the sequence the geologist can have input. The geologist's role in land-use planning is illustrated through use of a computer-oriented resource evaluation system, derivative mapping, to identify land suitability for septic-tank systems, solid-waste landfills, and spray-irrigation waste treatment.

9:20 am EPS-33 An Update on Exxon's Activity in the Eastern Gulf of Mexico, ART JOENS, Exxon Company, USA, P.O. Box 60626, New Orleans, Louisiana, 70160.

9:40 am EPS-34 Diagenesis Of The Inglis and Avon Park Formations, Crystal River, Florida* A. F. Randazzo, Dept. of Geology, University of Florida, Gainesville, Florida 32611.
--Petrographic analysis of six cores, penetrating the Inglis and Avon Park Formations, reveal three distinct lithofacies representing a regressive-transgressive cycle, aerial exposure and diagenesis. Evolution of pore spaces varies with the lithofacies and is a function of primary deposition and diagenetic history. The general tendency has been towards obliteration of primary voids by compaction and calcite and dolomite infilling, but several zones have experienced solution enlargement.
--Solution, recrystallization and inversion, dolomitization, pyritization and multiple phases of calcite cementation have substantially effected these lithofacies. There is evidence for penecontemporaneous dolomitization in a supratidal environment, as well as post-depositional dolomitization by Mg-rich groundwater flushing. The hydrologic regime and the original fabric of the carbonate rock controlled the types of cement present.
*Research supported by the Florida Water Resources Research Center.

10:00 am COFFEE BREAK

10:20 am EPS-35 Warm Mineral Springs, 1975: A Multi-disciplinary Approach to a 10,000 BP Archaeological Site - W. A. Cockrell, Department of State Underwater Archaeological Research Section; Department of Anthropology, Florida State University, Tallahassee, Florida 32304.
Twenty eight C^{14} dates from the fifteen meter below surface level in a collapsed drowned sinkhole in Sarasota County in direct association with human skeletal and artifactual materials have led to intensive multidisciplinary research in an attempt to reconstruct early man's behavioral patterns and his surroundings.

10:40 am EPS-36 Upwelling of Geothermally Heated Ground Water: A Factor in Archeological Preservation at Warm Mineral Springs Sinkhole, Southwest Florida by F. A. Kohout, U. S. Geological Survey, National Center (411), Reston, Virginia 22092. Accumulation of ice in polar latitudes during the Pleistocene glacial epoch lowered sea level and exposed limestones of the Floridan Plateau to the dissolving effects of fresh water percolating downward to the water table. Caverns festooned with stalactites were formed and occasionally collapsed to form sinkholes. Lowered ground-water levels (responding to lowered sea level) permitted habitation of some Florida sinkholes by humans who are believed to have migrated southward on the North American Continent from Asia via the Bering Straits land bridge. Warm Mineral Springs sinkhole is particularly unusual compared to most Florida sinks because warm (90°F) hydrogen-sulfide rich saline water flows upward from a tunnel at about 220 ft (67 m) bpwl (below present water level). All walls of the sinkhole overhang to form a cathedral-shaped cavity about 400 ft (122 m) in diameter at the bottom. Human bones dated at about 10,000 years before present occur in the stalactite-hung caves at 20 to 40 ft bpwl. The high H_2S content (no oxygen) in the upwelling geothermally heated water is a probable factor in the excellent preservation of bones and stalactites in Warm Mineral Springs and nearby Little Salt Springs sinkholes.

11:00 am EPS-37 Recent Trends in Trophic Classification of Lakes P.L. BREZONIK, Environmental Engineering Dept., University of Florida, Gainesville, Florida 32611.
--The trophic state of a lake is defined by a combination of nutrient and productivity-related parameters rather than by any single measure, and this has caused many problems in attempting to classify lakes according to trophic state. Multivariate statistical approaches such as cluster analysis have been used to derive trophic classes for Florida lakes from trophic indicator data from 55 lakes. Indicator values associated with the various trophic classes are described, and techniques are described whereby lakes can be placed into one of the derived trophic classes. Classification of lakes according to watershed characteristics and pollution potential is also described.
--The usefulness of trophic indices as means of summarizing information on a lake's trophic state is discussed, and several approaches to the development of trophic indices are described.

11:20 am EPS-38 Sedimentary Dynamics and Significance of Sea Grass Beds*. Harold R. Wanless, School of Marine and Atmospheric Science, University of Miami, Miami, Florida 33149.

Sea grass beds, through modification of substrate texture and mobility are a major influence on the physical dynamics of shallow marine sedimentary environments. By blade baffling of wave and current energy and blade epiphytic entrapment, grass beds tend to produce sediment deposition dominated by suspension transported particles. This can generate a rapidly building sedimentary sequence from which bedload transported sands are largely excluded. Root and rhizome substrate stabilization inhibits sediment reworking and provides a setting for a commonly rich Chione-Codakia dominated molluscan community.

Grass bed loss (by natural or man-induced processes) tends to cause major and rapid substrate modification through loss of suspension transported particles, mobilization of bedload transported particles into dunes and deepening of the bottom. On littoral platforms, adjacent shorelines may be eroded because of increased exposure. In lagoons, water clarity will decrease because of both decreased substrate stability and a decrease in the benthic community that packages fine sediment into pellets.

Sea grass beds can produce thick bimodal textured sediment accumulates (under continual grass bed cover), repetitive lensoid packages of fining upwards sequences (by storm "blow-out" formation and migration) or repetitive blanket fining upwards sequences (by widespread storm erosion winnowing and grassbed recolonization). The combined textural-molluscan assemblages and sequence provide criteria for differentiating sea grass generated sedimentary sequences from similar sequences produced in other sedimentary environments.

Widespread platform erosion during Pleistocene sealevel regressions commonly destroyed these sequences in south Florida leaving only a quartzose mixed-environment coarse skeletal lag. Molluscan assemblages and weathering allows reconstruction of grass bed paleoenvironments.

*Research Supported by Sea Grant.

11:40 am EPS-39 Beach Nourishment, Natural and Artificial, H.K.BROOKS, Department of Geology and the Coastal and Oceanographic Engineering Laboratory, University of Florida, Gainesville, FL.

--The concept of a "river of sand" in the littoral drift system has misled a generation of geologists and engineers. Except for artificial methods of inlet bypassing, man-made structures in the surf zone are of no lasting value. Lagoons and estuaries are natural traps for sediments from the land, shore and offshore sources. It is a fact that particles on the beaches of Florida have not traveled a great distance in the present cycle. There are no rivers in Florida now contributing sand to the beaches; new sediment must come from erosion of the shore or from offshore. Biogenic sources can not be overlooked. Study of the Holocene beach and barrier island deposits prove a formative interval occurred about 4,500 to about 1,500 years ago. The source of sediment was from offshore. With the present high stand of sea level, this supply of sediment has been largely exhausted or is now beyond the reach of waves. It is for this reason that beach erosion can only be effectively prevented by artificially adding new sediment. The source of the sand should be from coarse, shelly deposits. A booster pump on the dredge ladder makes it possible to dig multiple, deep borrow pits into suitable Pleistocene deposits beyond the surf. Lithified zones result in increased dredging costs: however, 5 to 15% rock fragments in the "spoil" are probably worth the increased investment. A minor amount of particles, pebble to cobble size, contribute to permanency without detracting from the characteristics of the restored beach.

Friday 7:40 am Room Science 135

Session B

Edward O'Donnell, presiding

7:40 am EPS-52 On Revising the Mapped Drainage Area and Natural Flow System of the Withlacoochee River Basin in the Southwest Florida Water Management District, Pedro A. Hernandez and Garald G. Parker. Southwest Florida Water Management District, P. O. Box 457, Brooksville, Florida 33512.

--Recent hydrologic studies of the lower Withlacoochee River Basin in the Southwest Florida Water Management District have shown that an area of about 876 square miles, previously assigned to the Waccasassa River Basin, is an integral part of, and the largest tributary to, the Withlacoochee River. The initial assignment of the 876 square miles was determined by the surface-water drainage pattern of Rainbow Springs and its outlet into the Withlacoochee River, Blue (Rainbow) Run. Groundwater flow studies indicate, however, that a large integrated underground drainage system drains this 876 square-mile area into Rainbow Springs and Blue Run, contributing an average annual daily flow of 788 cfs or 509 mgd, equal to a runoff of about 14.5 inches per year. This makes Rainbow Spring - Blue Run hydrologic system the largest tributary to the Withlacoochee. In fact, at its juncture, the Rainbow Spring - Blue Run system's 14.5 in./yr. runoff exceeds that of the Withlacoochee itself, which is only 8.8 inches per year. Blue Run contributes 70 per cent of the inflow into lower Withlacoochee above Inglis Dam.

8:00 am EPS-40 Variability in Building by Reef Corals, PHILLIP DUSTAN, P.O. Box 1536, Key Largo, Fla. 33037.
--The amount of variation displayed by reef corals has amazed observers since the time of Darwin. Hermatypic scleractinian corals are responsible for the construction of modern reefs as they provide the framework and a good deal of the infilling sediments that form the basic wave resistant structure known as a coral reef. It is believed that the remarkable ecological role played by hermatypic corals is due to the symbiotic relationship these coelenterates have evolved with a dinoflagellate commonly referred to as zooxanthellae. Together with the zooxanthellae the processes of calcification and photosynthesis have been linked to enable corals to deposit calcium carbonate faster than the environment erodes it.

The phenotypic variation of reef corals is a product of variability in the animal host and algal symbiont. Each may be capable of a certain degree of independent variability, both physiological and genetic. The relative contributions of genetic variation and physiological plasticity have been speculated upon greatly in the last 100 years in the form of the question, "What constitutes a species of scleractinian coral?"

My investigations have yielded data that strongly suggests that the ecotype concept as defined by Turreson(1922) and Gregor(1944) and demonstrated by Clausen, Keck, and Hiesey(1935) applies to hermatypic coral populations and that natural selection acts on both animal and algal genomes. Coevolution of these two components of coral colonies allows for the diversity of ecotypes and possibly species that inhabit coral reefs.

8:20 am EPS-41 Health Problems of the Florida Coral Reefs, A. ANTONIUS, Florida Reef Foundation, P.O.Drawer 1468, Homestead, Florida 33030.
--Investigations into the health condition of the coral reefs inside the John Pennekamp Coral Reef State Park (Key Largo) and the Hen and Chickens Reef (Plantation Key) have been carried out during 1973/1974. To validate results, data from the Barrier Reef in British Honduras were used for comparison. A method has been developed which uses the percentages of live versus dead coral surface area to quantitatively describe the reefs' health. The main State Park Reefs appear to be only insignificantly inferior in health to the Barrier Reef; dead corals in both cases remain below 10 percent. The Hen and Chickens Reef was found to be devastated to over 80 percent. Other reefs outside of the State Park, not yet surveyed quantitatively, are believed to show various degrees of deterioration.

8:40 am EPS-42 Ecologic or tectonic control of facies sequence in a Upper Miocene patch reef, Northeastern Spain Mateo Esteban, Department of Petrology, University of Barcelona, Avda. J. Antonio 585, Barcelona 7, Spain.

Reefs with common fringing patterns are developed over highs of the Cretaceous basement in an elongated marine lagoon. The most complete profile at Sant Pau d'Ordal contains the following vertical sequence of facies: marsh, beach and tidal channel calcarenites, mud bank, patch reef complex and bay and marsh facies. Tectonic activity is considered as the main control of the general facies distribution in the basin. However, in detail, mud bank and patch reef facies are interpreted as the result of local ecologic succession of communities, with some modifications related to the evolution of a marginal reef tract.

9:00 am EPS-43 Strontium Isotope Ratios & Petrogenesis - Value & Limitations J.J. STIPP Geology Dept., University of Miami, Coral Gables, Flordia 33124.
-- Geologists employ a number of methods in their 'chemical' efforts to illuminate the origin of major rock distributions of the earth. One of the more exotic (therefore expensive) and powerful techniques developed and improved over the past 15 years is the

measurement of initial Sr87/Sr86 isotopic ratios. As with all such data, coherent patterns and clear relationships are sought which hopefully will provide definitive answers regarding petrogenesis. It seldom does. In fact, the light shed more often replaces the original darkness with a tantalizing kaleidoscope of shadows. A recent unpublished and striking example to be discussed is the comparative study of two major island arc regions; North Island, New Zealand and the Lesser Antilles, West Indies.

9:20 am EPS-44 Uranium Isotope Disequilibria in Natural Waters - Recent Studies, J.B. COWART, Geology Dept., Florida State Univ., Tallahassee, Fl. 32306
--Variation of relative abundances of two isotopes of uranium, U-238 and daughter U-234, from the secular equilibrium value is the general case in both fresh and marine waters. It has been observed that U-234 deficiency is associated with near surface oxidizing environments; in deep zones the U-234 is almost always found to be in excess.
--A proposed model of the mechanism of isotope fractionation may allow the system to be useful as a paleo-climate indicator, as an ore exploration method and as an earthquake predictor. In addition, the conservative properties of dissolved uranium can be used as a tracer and for mixing volume calculations in shallow aquifers.

9:40 am EPS-45 Buoyancy Regulation and Vertical Migration in Planktonic Foraminifera* D.S. Marszalek, Marine Geology & Geophysics, School of Marine and Atmospheric Science, University of Miami, 6400 Rickenbacker Causeway, Miami, Florida 33149
--Planktonic foraminifera maintain neutral buoyancy even though the calcite test is approximately 2.7 times denser than ambient seawater. Protoplasm compensates for test weight and bouyancy is regulated mainly by control of the extent of vacuolation and of the s.g. of vacuolar contents. Buoyancy regulation allows controlled positive and negative vertical migration through the water column. Effective sinking is possible only with the ballast provided by the calcite test. Spines and pseudopodia retard vertical movement by maximizing surface area and friction with seawater. Irreversible sinking during late ontogeny is initiated by an increase in the amount of ballast through secondary calcification of the test and possible loss of spines. Increase in overall test size without a corresponding increase in wall thickness is an adaptation to warmer, less dense seawater. The test size - water density relationship is evident in the distribution of modern populations of planktonic foraminifera as well as in glacial and interglacial assembleges of Pliestocene fossil faunas isolated from deep sea cores.
*Research supported by NSF grants GA-31969X, GA-41656, and GA-35077.

10:00 am COFFEE BREAK

10:20 am EPS-46 Cenozoic Cherts, "cherts", and opaline claystones of the Southeastern Coastal Plain. S. W. Wise and F. M. Weaver, Geology Dept., 101 Carraway Bldg., Florida State University, Tallahassee, Florida 32306
--Siliceous deposits of high purity unidimensionally disordered alpha-cristobalite (Opal-CT) are not uncommon in Paleogene and Miocene sediments of the Southeastern Coastal Plain. Their origin is a matter of dispute. Because they lack easily identified microfauna or flora but do contain some volcanogenic diagenetic minerals, many of the claystones have been classified as bentonites or altered volcanic ashes. Scanning electron microscope studies, however, have revealed imprints or molds of siliceous microfossils in most samples, suggesting a biogenic origin. True quartz cherts in the opaline deposits (example, Tallahatta Formation) are probably due to secondary weathering.

10:40 am EPS-47 Geological Analysis Utilizing an Electron Probe, ARTHUR B. MERKLE, Geology Department, Florida Atlantic University, Boca Raton, Florida 33432.
--Two related instruments, the scanning electron microscope and the electron probe microanalyzer are capable of producing, demagnifying, and focusing an electron bundle on a sample. In the analysis of geological material the most commonly used signals generated at the electron probe-sample interface are secondary, and backscattered electrons; wavelength and energy dispersed x-rays. Secondary and backscattered electrons produce visual images of the sample surface. Wavelength and energy dispersed x-rays yield compositional information. This paper considers specific applications of electron probe analysis to geological research in petrography and mineralogy.

11:00 am EPS-48 Wavellite--R. G. Stevenson, J. E. Goetz, Univ. of South Florida.--New and more complete x-ray powder diffraction data for Wavellite - $Al_3(OH)_3(PO_4)_2.5H_2O$ are reported. Several recent studies in Florida, especially Polk County, in which wavellite was involved indicates the probability that the x-ray powder data recorded on J.C.P.D.S. card number 17-203 and number 2- 75 are incomplete. Subsequent careful investigation of wavellite samples from Arkansas, Tennessee and Florida has shown that the recorded data is indeed incomplete and has produced the amended data reported herein. The new x-ray data appear to be compatible with the structure cell and space group reported in Dana's System of Mineralogy, 17th Ed., Vol. 2. Attention is directed particularly to the pair of intense peaks in the low angle region indicative of d-spacings of 8.68Å and 8.43Å. This doublet is distinctive and characteristic of wavellite. Failure to recognize this fact can lead to considerable frustration, lost time, and possibly error, in trying to identify the "other mineral present". Optical data and chemical analyses are reported where feasible for the samples used in the investigation.

11:20 am EPS-49 Anorthosite-syenite complexes as refractory residues from partial melting of metasediments by George W. DeVore, Dept. Geology, Florida State Univ., Tallahassee, Fla. 32306.

Partial melting accompanied by melt extraction during granulite facies of regional metamorphism could result in anorthosite and associated syenites as refractory residues with quartz diorite, quartz monzonite or granite as the minimum melting partial melts. Normative calculations on calcareous geosynclinal sediments yield anorthosite residues and calcium poor geosynclinal sediments yield mangerite or syenite residues. Marble and quartzite inclusions in the anorthosite-syenite masses could represent local excesses of these constituents in partial melting. Heier (1973) suggested that the low Rb, Cs, U, and Th contents of granulate facies rocks were the result of their depletion by partial melting and removal. Anorthosite and syenite have low Rb and Cs contents. Feldspars in granite phases in the Laramie Range, Wyoming syenite have six to eight times more Rb than in the syenite feldspars.

11:40 am EPS-50 The Tectonic Evolution of Jamaica, W. I., E. O'Donnell, and R.G. Stevenson, Geology Dept., University of South Florida, Tampa, Florida 33620.

The tectonic position of Jamaica is significant in that it is on the northern margin of the Caribbean Plate where it abuts the North American Plate. The oldest dated rocks on Jamaica are of Early Cretaceous age and there is little evidence that the island antedates the Jurassic. Throughout the Jurassic and Early Cretaceous there was extensive vulcanism in the area. Vulcanism diminished in Late Cretaceous time so that clastic and carbonate beds alternated with tuffs and mixed volcanic-sedimentary units. The Mesozoic ended with the emplacement of granodiorite plutons during the Laramian orogeny. Normal marine sedimentation, clastic and biochemical, was the rule during the Cenozoic. Late Miocene tectonism has tilted Jamaica resulting in a raising of the north shore and a consequent drowning of the south shore. The topography and depositional patterns have been severely altered.

Friday 12:50 pm Collegiate Room, Cafeteria
Annual Business Meeting of the Florida Academy of Sciences
Robert W. Long, University of South Florida, presiding

Friday 1:30 pm Room Science 137
SYMPOSIUM - LANDSPREADING OF SECONDARY EFFLUENTS
Rudy J. Wodzinski, Florida Technological University, presiding

3:30 pm COFFEE BREAK

3:45 pm Room Science 137
Business Meeting of the Earth and Planetary Sciences Section
Patrick J. Gleason, Florida Flood Control District, presiding

4:00 pm EPS-51 Biostratigraphic Control - The Road to Understanding M. E. Hunter, Coastal Petroleum Company, P. O. Box 297, Pinellas Park, Florida 33565.

--Stratigraphic control of surface formations in areas of few outcrops can be obtained by following five steps:

1. Recognition of the lithologic members at type sections
2. Recognition of the fossil fauna at each type section
3. Lateral correlation of some members by means of their faunas
4. Vertical positioning of some members by means of supraposition
5. Assessment of age of each fossiliferous member by use of time scales such as the mollusk, planktonic, nannoplankton or vertebrate zonations

An illustration of biostratigraphic analysis and control is provided by discussion of the Tamiami formation, one of Florida's troublesome heteropic units.

7:00 pm Collegiate Room, Cafeteria
Annual Banquet of the Academy

MEDICAL SCIENCES SECTION

Friday 8:45 am Room Science 203

Michael J. Sweeney, Florida Technological University, presiding

8:45 am MS-1 CORRELATION OF CORONARY HEART DISEASE WITH INCREASED MILK ANTIBODY TITERS, R. P. Tarnuzzer, S. K. Walsh, E. Spinos, S. D. Klotz, & M. J. Sweeney, Florida Technological University, Department of Biol. Sciences. The presence of antigen-antibody complexes were theorized as the possible immunological mechanism responsible for coronary heart disease (Davies, Davies, & Richards). Increased levels of circulating antibodies to milk proteins were detected by Davies with a tanned red cell haemagglutination technique. In this study, antisera to the milk proteins were produced by the intramuscular injection of New Zealand White rabbits. Haemagglutination, using heated and adsorbed serums, with four types of treated milk, was performed. By the use of microtiter technique, higher titers towards milk antigens were detected in sera of patients with coronary heart disease. Thus far, results indicate a possible clinical diagnostic technique for the detection of coronary heart disease.

9:00 am MS-2 Human Histoplasmosis in the United States: A Geographical Survey RICHARD DANIEL KRESKE, University of Miami. This paper is a study in Medical Geography and shows the geographic incidence of positive reactions to the fungus, histoplasma capsulatum, in the United States. Areal variations are shown on a county-wide basis for the entire country. An attempt is then made to ecologically correlate environmental conditions and vectors with areas of high incidence. The role of climate, soils, and avian forms is shown as the dominant forces related to variations from place to place.

9:15 am MS-3 CELL WALL ANTIGENS OF HISTOPLASMA CAPSULATUM. M. J. Sweeney and R. S. White, Florida Technological University, Department of Biol. Sciences. Purified cell walls of H. capsulatum were subjected to mild acid hydrolysis. Centrifugation of these acid hydrolyzed walls yielded a supernatant that was active after neutralization in delayed reaction hypersensitivity (DHR) in guinea pigs. Fractionation of the supernatant using Sephadex G25 column chromatography yielded five major fractions which were subjected to high voltage paper electrophoresis and thin layer chromatographic analysis. Each fraction from the G25 column contained a reducing component which moved like a strong acid in high voltage paper electrophoresis. This apparently low molecular weight material stained as an acid in a thin layer chromatographic procedure for the separation of organic acids and was capable of illiciting a DRH in guinea pigs.

9:30 am MS-4 Developmental Abnormalities in Chick Embryos Caused by Streptomycin. S.A. BERNSTEIN, S. LOVECE, G.M. COHEN. Florida Institute of Technology.--Although the chronic administration of the antibiotic streptomycin has long been known to damage auditory and equilibrial functions of the inner ear, no previous research has been attempted on the possibly detrimental actions of streptomycin on the developing embryo. For our experiments on the chick embryo, we selected concentrations of streptomycin sulfate that are comparable on a weight basis with dosages administered to human infants and adults: 25 and 50 mg/kg body weight. The antibiotic was dissolved in a physiological saline and injected into the yolk sac. These dosages regularly produced hydrocephaly, which was characterized by enlarged ventricles and protrusion of the parietal-occipital region of the skull, and on one occasion produced a cyclopic embryo. When we administered higher dosages (150 mg/kg egg weight), the embryos aborted,usually before 72 hours.

9:45 am MS-5 Fusarium Sp. - An unusual case of opportunism. R. L. Bourguignon, A.F. Walsh and C. Baro. Orange Memorial Hospital, Orlando, Florida, 32806. Clinical and laboratory studies of a knee infection with Fusarium Sp. following a puncture wound from a thorn bearing plant are presented.

10:00 am MS-6 THE SIGNIFICANCE OF NATIVE CANINE PROTEIN INTERFERENCE WITH IMMUNE RESPONSE TO INFECTION WITH DIROFILARIA IMMITIS. D. F. Qualls & M. J. Sweeney, Fla. Tech. Univ., Dept. of Biol. Sciences. Live D. immitis microfilariae have demonstrated the ability to elicit a pronounced immune response in New Zealand white rabbits. (Previous publication) High antibody titers have also been demonstrated in in vitro studies of canine (Wong). Antibody titers observed in canines decline upon the emergence of immature microfilariae from adult nematode within the blood supply of these individuals. The cuticle of this and other filarial worms has not demonstrated antigenicity concurrent with these results. Immunoelectrophoresis in this laboratory has revealed native canine protein in close association with these micro filariae. It would appear that this association interferes with normal immune response concurrent with infection.

10:15 am COFFEE BREAK

10:30 am MS-7 Atoxic Snake Neurotoxin in Amyotrophic Laterial Sclerosis Therapy. M. Sanders, O. N. Fellowes, Sanders Medical Research Foundation. Atoxic neurotoxin of snake venoms was used in a therapeutic approach to the disease of amyotrophic lateral sclerosis (ALS). The study was initiated by using poliomyelitis infection in monkeys as a model. The infected animals were treated with the modified neurotoxin. The poliovirus and the disease of ALS basically attack the anterior horn cells of the central nervous system and the pathology is similar to that found with crude cobra toxin in monkeys. The formula for and the inactivation of the contained snake venoms in the therapeutic medication is described. A total of 113 patients with varying degrees of ALS were treated with the atoxic neurotoxin. After an average treatment period of 15 months 52 patients were stabilized and 13 have improved upon their original status. The atoxic neurotoxin is considered to be a cell receptor blocking agent which would make it unique as a new therapeutic principle.

11:00 am MS-8 Biochemical associations and gene regulation of the tumorous-head phenotype in Drosophila melanogaster KUHN, D.T., and G.N. CUNNINGHAM, Department of Biological Sciences and Department of Chemistry, Florida Technological University, Orlando, Florida--Our data demonstrate unusually high levels of aldehyde oxidase activity during various critical stages of eye development. Genetic as well as cytological data suggesting the existence of an important relationship between the genes necessary for aldehyde oxidase synthesis and the genes responsible for the tumorous-head trait will be discussed.

11:15 am MS-9 Cellular Damage in the Renal Cortex of Rat Kidney Following Ischemia: A freeze-fracture Study*. S. E. COLEMAN, J. DUGGAN and R. L. HACKETT, Veterans Administration Hospital, Gainesville, Florida.--Damage to the inner cortex of the kidney following occlusion of the blood supply has been observed after 20, 60, and 120-min ischemia by the technique of freeze-fracture. The principal changes in proximal tubule cells after 20-min ischemia were a marked decrease in particles in the inner membrane fracture face of the brush border and the development of ridges in the inner fracture face of the epithelial membrane. After 60-min ischemia, large bare areas were observed in the particle-rich outer fracture face of the basal plasma membrane and few particles remained in membranes of the endoplasmic reticulum. Reflow of blood for 240 min partially reversed these changes after 20-min ischemia but not after 60-min when damage to the kidney is irreversible. These changes in the renal inner cortex following ischemia are thought to reflect alterations in membrane function and/or permeability.

*Research supported by Veterans Administration MRIS 3369-01

11:30 am Room Science 203

Business Meeting of the Medical Sciences Section

Michael J. Sweeney, Florida Technological University, presiding

Friday 12:50 pm Collegiate Room, Cafeteria

Annual Business Meeting of the Florida Academy of Sciences

Robert W. Long, University of South Florida, presiding

Friday 1:30 pm Room Science 137

SYMPOSIUM - LANDSPREADING OF SECONDARY EFFLUENTS

Rudy J. Wodzinski, Florida Technological University, presiding

7:00 pm Collegiate Room, Cafeteria

Annual Banquet of the Academy

PHYSICAL SCIENCES SECTION

Friday 8:30 am Room Science 220

ENERGY SOURCES

William B. Phillips, State University System, presiding

8:30 am PS-1 The Nuclear Option--The Road to Energy Self Sufficiency? M. J. Ohanian, Department of Nuclear Engineering Sciences, University of Florida. The current status of nuclear electric power generation will be reviewed with emphasis on the issues which have cast some doubts on the promise for nuclear energy to amke a major impact towards the national goal for energy self-sufficiency by 1985. The near and longer-term prospects for the nuclear option will be examined with particular attention to advance nuclear power concepts such as breeder reactors and nuclear energy centers, from the point of view of uranium resources, nuclear safety, transportation and management of radioactive wastes.

9:00 am PS-2 Thermonuclear Energy, Harry S. Robertson, Department of Physics, University of Miami, Coral Gables, Fla. 33124. The achievement of controlled thermonuclear energy would have profound effects on the course of history, with extensive world-wide political, economic, and environmental consequences. The basic idea of fusion power is reviewed, and it is pointed out that the basic science necessary to assure us of the possibility of fusion power is not yet complete. The problems of confining and heating plasma are reviewed, and designs of several of the apparently most promising approaches to the realizations of thermonuclear power are outlined. Conjectured time tables for the achievement and utilization of fusion power are presented and discussed.

9:30 am PS-3 Solar Energy - Conversion and Utilization. Eric A. Farber, University of Florida. The following topics will be discussed: the nature and availability of solar energy, solar properties of materials, water and house heating, refrigeration and air conditioning, distillation and liquid waste recycling, mechanical and electrical power generation, solar furnaces, and solar electric transportation.

10:00 am PS-4 Exploration of Geothermal Energy Resources in Florida. Roman K. C. Johns, Florida Institute of Technology.--Proposed exploration represents a joint effort of Dr.D. L. Smith (University of Florida), Dr. W.F.Tanner and Dr. J.K.Osmond (Florida State University), and the speaker who serves as Principal Investigator. The Florida Power and Light Company cooperated in the preparation of the program and is providing ten bottom hole temperature measurements. Areas presently considered are primarily those of recent volcanic and tectonic activities. The thick sequences of sedimentary rocks with relatively low thermal conductivity that comprise the Florida platform suggest that high thermal gradients may occur. The existence of warm springs and isolated bore hole data are indicative of high gradients. The proposed geothermal exploration program consists of (1) direct thermal measurements in equilibrated bore holes and heat flow calculations, (2) radioisotope ratio determinations in well and spring waters, (3) residual gravity anomaly surveys and analyses. Three pilot areas have been selected for exploration.

10:30 am COFFEE BREAK

10:45 am PS-5 Current Possibilities of the Use of a High Temperature Fluid Heated by Solar Radiation as Thermal Energy Carrier* E.A. FARBER, C.A. MORRISON, J.T. PYTLINSKI, H.A. INGLEY and K.M. ELDER, Univ. of Florida.--Currently applied methods to produce a high temperature of a circulating fluid by using solar energy will be described. Present applications of such a fluid (tetracresylsilicate or cottonseed oil) as thermal energy storage agent which could be used to convert solar energy into mechanical energy or electric power, or to be used in a 24-hour service solar stove will be discussed. The anticipated results in form of energy savings when using a solar stove will also be presented. The thermal balance, the thermal properties of some fluids, and the actual operation of this type of installation in laboratory conditions will be described in detail.

*Research partially supported by NSF grant

11:00 pm PS-6 Indirect Production of Electricity by Using Solar Energy* E.A. FARBER, C.A. MORRISON, J.T. PYTLINSKI, H.A. INGLEY and P. ARNOLD, Univ. of Florida.--A project of a solar-electric energy conversion installation of a thermal capacity of about 30 KW, operating in the range of a working fluid temperature of 130 to 180°F is presented. The solar energy is converted into electric power through a mechanical intermediary. The conversion technique and different prime movers presently in use will be described. A high vapor pressure generating evaporator-condensor assembly which uses ammonia vapor as the working fluid and is actually in operation will be presented. The thermal properties of several other working fluids will also be discussed. A comparison between the anticipated performance of a reciprocating engine and a turbine will be made on the base of their temperature versus entropie characteristics. The criteria for selection of appropriate thermal cycle, type of electricity storage and AC versus DC power generation will also be analyzed.
*Research partially supported by NSF grant

11:15 am PS-7 A Solar Parabolic Concentrator With Hydraulic Sun Tracking Mechanism* E.A. FARBER, C.A. MORRISON, H.A. INGLEY, J.T. PYTLINSKI and D.B. WIGGINS, Univ. of Florida.--To collect solar energy, flat-plate collectors or a solar concentrator is usually used. The construction of a solar parabolic concentrator with its tracking mechanism is described. The concentrator consists of a highly reflective solar radiation, parabolically-shaped shell; a collector-blackened, vacuum jacketed copper tube; and a special support which provides a high degree of concentrator mobility. The concentrator is automatically operated by the incident solar radiation. This is accomplished by an arrangement of two hydraulic cylinders with freon as the working fluid. A simple gear transmits the motion of pistons in the cylinders to the axle of the concentrator. The system is self-contained and needs no other source than sun energy to drive it. The techniques used in the development and testing of the device will be discussed.
*Research partially supported by NSF grant.

11:30 am PS-8 Solar Heating of Buildings* E.A. FARBER, C.A. MORRISON, H.A. INGLEY, J.T. PYTLINSKI, F.J. TARUD, Univ. of Florida.--For over twelve years, conventional energy sources had supplied heating, cooling, and domestic hot water for the University of Florida's Mechanical Engineering Research Residence. In recent years, these functions have been furnished by solar powered devices. The University of Florida's Solar House is in its third winter with heating provided by solar energy. This paper discusses the technical data illustrating the performance of the University of Florida's solar heating system.
*Research partially supported by NSF grant

11:45 am PS-9 Solar Cooling of Buildings—An Intermittent System* E.A. FARBER, C.A. MORRISON, H.A. INGLEY, J.T. PYTLINSKI, E. SUAREZ, Univ. of Florida.--This paper discusses the techniques used in the design and construction of a solar powered intermittent ammonia/water absorption air conditioner. Operational data and comparisons of the energy consumption by the solar system and by conventional all-electric systems are discussed.
*Research partially supported by NSF grant

12:00 am PS-10 Solar Cooling of Buildings-A Continuous System* E.A. FARBER, C.A. MORRISON, H.A. INGLEY, J.T. PYTLINSKI, J.A. CLARK, Univ. of Florida.--This paper discusses the operational characteristics of a solar powered, continuous ammonia/water absorption air conditioning system. The techniques used in designing such a system and the results to be expected from such a unit are included in this paper.
*Research partially supported by NSF grant

12:15 pm PS-11 Testing and Evaluation of Performance of Absorbing Coatings Used On Solar Collectors E.A. FARBER, C.A. MORRISON, J.T. PYTLINSKI, and H.A. INGLEY, Univ. of Florida.--Measurement procedure of performance of some absorptive coatings under clear-sky solar radiation and using simulated radiation in laboratory conditions is described in detail. The comparison of performance of several coatings was evaluated on the base of the coating thermal output. A coating performance factor was calculated by using the relation: $\alpha_c = \alpha_s\ (t_c - t_a)/(t_s - t_a)$ where α_c is the tested coating performance factor, α_s is the standard coating performance factor, t_c is the temperature of the tested coating, t_s is the temperature of the standard coating and t_a is the ambient temperature. The possible sources of measurement errors and their influence on the testing procedure will also be discussed.

Friday 12:50 pm Collegiate Room, Cafeteria

Annual Business Meeting of the Florida Academy of Sciences

Robert W. Long, University of South Florida, presiding

Friday 1:30 pm Room Science 137

SYMPOSIUM - LANDSPREADING OF SECONDARY EFFLUENTS

Rudy J. Wodzinski, Florida Technological University, presiding

3:30 pm COFFEE BREAK

3:45 pm Room Science 220

Frank B. Wood, University of Florida, presiding

3:45 pm PS-12 Applications of Nuclear Physics to Environmental Problems*. J. William Nelson, Florida State University. In the past few years, rapid progress has been made in the sensitive measurement of the elemental content of matter by automated, broad range nuclear techniques. Environmental investigations of particulate matter in the atmosphere have been carried out by neutron activation, proton induced x-ray and proton scattering analyses. The properties, sample requirements, advantages and limitations for these techniques exist in diverse areas such as analyses of water, blood, biological matter, geological specimens, etc. In addition to the multielement methods, particular nuclear reactions are being employed for quantitative determination of specific elements on isotopes.

4:15 pm PS-13 Middle Ultra Violet Atmospheric Radiation, O Depletion and Skin Cancer. Alex Green, University of Florida.

We describe the radiation field of the atmosphere in the middle ultra violet spectral region. We begin with current knowledge of the extraterrestrial solar irradiance. This is followed by a description of the attenuating processes of 03 and 02 which dominate atmospheric radiation transfer in this spectral region. In addition, we describe the properties of other atmospheric molecules which are active absorbers, their vertical distributions and the processes introduced by ultra violet photons at various altitude levels. Finally, some pertinent consequences of changes caused by anthropogenic chemical releases upon the stratospheric ozone layer and the consequences upon skin cancer incidence ratios are discussed.

4:45 pm PS-14 Tritium Transport in the Environment. D. H. JOHNSON and J. A. WETHINGTON, University of Florida.--The growing nuclear power industry and the use of nuclear explosives for natural gas stimulation will increase the inventory of T well above its prenuclear age value. Thermonuclear fusion reactors will generate more T per megawatt than fission reactors, and the limiting environmental effect for such plants will be T-generation. The interaction of HTO with various soils and rocks has been studied, and no T-retention was observed. This behavior contrasts sharply with the retention of cations such as ^{90}Sr. Our results show that T will move through the environment at the rate of groundwater flow.

7:00 pm Collegiate Room, Cafeteria

Annual Banquet of the Academy

Saturday 8:30 am Room Science 220

William B. Phillips, State University System, presiding

8:30 am PS-15 Thermal Expansion Measurements on Some Newer Optical Materials. J. S. Browder, Jacksonville Univ., and S. S. Ballard, Univ. of Florida. -- Thermal expansion measurements using a high-resolution, capacitance-type dilatometer have been made on several newly available infrared-transmitting optical materials. The range 77K (liquid nitrogen) to 300K (room temperature) was covered. Samples include Polytran II and V (polycrystalline KCl and CaF_2, respectively, as manufactured by the Harshaw Chemical Company). Data are also reported on optical-grade germanium, both single-crystal and polycrystalline, and are compared with earlier measurements made by other investigators on this important material.

8:45 am PS-16 High Frequency Electrodynamics of Living Systems---William Trantham, Florida Keys Community College---This presentation will involve the description and demonstration of a Kirlian high-frequency field autoelectron and autoion emission system which converts the non-electrical properties of living systems into electrical ones which can be photographed.

9:00 am PS-17 Digital Signal Analysis of Faraday Rotation in a Collisional Magnetoplasma. G. C. WOOD, S. C. BLOCH, P. W. LYONS, Univ. of South Florida.-- Faraday rotation provides a sensitive method of determination of electron density in the direction of the magnetic field in a magnetoplasma, and has been studied for satellite beacons[1] and radar echoes from the moon.[2] Using full digital computer methods[3] we present results, without approximation, for Faraday rotation for selected values of propagation length, plasma frequency, effective collision frequency, cyclotron frequency, wave frequency, and pulse width.

[1] C. G. Little and R.S. Lawrence, J. Res. NBS(D) 64, 335 (1960).

[2] J.V. Evans, J. Atmosph. Terr. Phys. 11, 259 (1957).

[3] S.C. Bloch, A.P. Boss, & P.W. Lyons, J. Geophys. Res. 79, 5261 (1974).

9:15 am PS-18 Instrumentation for Plasma Diagnostics with Ultra-Short Microwave Pulses, E. A. BENJAMIN and S. C. BLOCH, Univ. of South Florida.-- We discuss the method and advantages of time-domain analysis[1,2] of ultra-short microwave pulses used for plasma diagnostics, after a brief review of the more common frequency-domain method. Modern microwave technology made feasible the generation of picosecond pulses, and the computer-based Fast Fourier Transform has made the analysis practical. We discuss several techniques of pulse generation and our sampling scope/minicomputer analysis system.

[1] A. W. Baird, Proc. IEEE, 60,754 (1972).

[2] C. D. Lustig and D. T. Hayes, Proc. IEEE, 57, 800 (1969).

9:30 am PS-19 New Propagation Parameter for Ultra-Short Microwave Pulses in Magnetoplasma. S. C. BLOCH and P. W. LYONS, Univ of South Florida.-- Extreme distortion and time-dependent Faraday rotation occur for propagation of short electromagnetic pulses in magnetoplasma for some ranges of plasma parameters. In order to relate pulse and monochromatic waves for propagation-path diagnostic purposes we introduce a new parameter for the transmitted pulse train which has properties that correspond very accurately to results that would be expected for Faraday rotation of a continuous wave having the central frequency of the incident pulse spectrum. Results for 5 nsec pulses at 10 GHz are presented for varying propagation length, static magnetic field, electron density, and effective collision frequency.

9:45 am PS-20 Math Majors at Penn State Bertha Mather, retired -- This paper will discuss the academic performance of 84 students who entered The Pennsylvania State University as undergraduate, first year, mathematics majors at a time when a new series of mathematics courses was instituted for their training.

10:00 am Room Science 220

Business Meeting of the Physical Sciences Section

William B. Phillips, State University System, presiding

10:15 am COFFEE BREAK

10:30 am PS-21 NON-IO RELATED EMISSION FROM JUPITER AT A HIGH DECAMETRIC FREQUENCY. M.D. DESCH and T.D. CARR, Univ. of Florida.-- For the purposes of discussion and analysis the sporadic radio emission from Jupiter has often been divided into two components. One, composed of highly intense and richly time-structured events, is controlled by the satellite Io. The weaker component displays no consistent preference for Io phase and is probably uncoupled from any satellite control. The above dichotomy has been clarified as a result of 2 years of observationsmade by the University of Florida's 640 element dipole array operating at 26.3 MHz. By observing Jupiter's emission over a range of intensities covering over 4 orders of magnitude the above components have been equally sampled for the first time. If the low intensity emission is truly independent of Io then it must ultimately derive its energy from the solar wind as does the analogous terrestrial radiation. This prediction is tested.

10:45 am PS-22 Microsecond Structure of Jovian S-Type Radio Bursts* D. J. McGuire, R. S. Flagg, University of Florida, Gainesville, Florida. Jupiter is known to radiate both L(long) and S(short) type bursts at decametric wavelengths. The S-type burst, lasting some 30 milliseconds in a 500 kilocycle passband, has been shown[1] to exhibit fine structure on a microsecond scale. Using product-detected receivers with an inverse bandwidth integration time of two microseconds, a statistical analysis of the microburst duration, separation, and frequency has been undertaken. The mean microburst duration is approximately 30 microseconds, giving rise to the S-burst mean instantaneous bandwidth of 30 kilocycles. The microburst duration also allows an estimate at an upper limit for the size of the radiating region.

*Research supported by National Science Foundation and National Aeronautic and Space Administration.

[1] R.S.Flagg and T.D.Carr, Ap. Letters, 1, 47, (1968)

11:00 am PS-23 Optical Variations in Three Extragalactic Radio Sources* B.Q.McGIMSEY, A.G.SMITH, R.J.LEACOCK, R.L.SCOTT, and P.L.EDWARDS, Univ. of Florida.--Photographic observations of the sources PKS 0222-23, 3C 446, and NRAO 512 indicate that each has undergone changes in brightness of over one magnitude. The sources NRAO 512 and 3C 446 exhibit quite rapid optical variations (days or weeks) while the large optical variations of PKS 0222-23 take place in a period of months or years. All three sources display secondary outbursts superimposed on the decline in brightness following a major flare.

*Research supported by the National Science Foundation.

11:15 am PS-24 Jovian Decametric Radio Source Morphology* J. R. Thieman, A. G. Smith, R. J. Leacock, University of Florida, Gainesville, Florida, and J. May, University of Chile. By merging decametric radio observationsfrom the Universities of Florida, Chile and Texas, a study has been made of radio sources A, B, and C on an apparition-to-apparition basis in the 18-22 MHZ frequency range. Histograms of occurrence probability versus the orbital position of Io often show peaks that are bifurcated in the latter coordinate with smaller secondary peaks preceding the main peak. Histograms of occurrence probability versus the position of Io and central meridian longitude reveal the origins of the secondary peaks. The sources of the asymmetrical structure of the main peaks are also found in the two-dimensional histograms. These plots show recurring shapes which may be theoretically significant.

*Research supported by the National Science Foundation.

11:30 am PS-25 The Four Year Intensity Decline of the Peculiar Extragalactic Source OJ-287* R. L. Scott, A. G. Smith, B. Q McGimsey, R. J. Leacock, and P. L. Edwards, University of Florida; K. R. Hackney and R. L. Hackney, Western Kentucky University; G. H. Folsom, Agnes Scott College. The extragalactic source of OJ-287 has exhibited a four year decline in average intensity greater than $3^{m}.25$ in the photographic U, B, and V. Vigorous short-term activity accompanied the long decline. Though statistical support is lacking, removal of the long-term component by computing the residuals about parabolic least-square fits to the data suggests possible short-term color effects.

*Research supported by the National Science Foundation.

11:45 am PS-26 Bayesian Analysis of the Weibull Failure Model Under Stochastic Variation of the Shape and Scale Parameters* CHRIS P. TSOKOS and A.N.V. RAO, Univ. of South Florida. Consider the Weibull probability density function as a failure model given by

$$f(t;\alpha,\theta) = \begin{cases} \frac{\alpha}{\theta} t^{\alpha-1} \exp\{- \frac{t}{\theta}\}, & 0 < t < \infty \\ 0, \text{ elsewhere} & 0 \infty \alpha, \theta \end{cases}$$

where θ is the scale parameter, α is the Weibull slope or shape parameter and θ^{α} is the characteristic life. In the present paper we study the sensitivity of the Bayesian reliability estimate when one of the parameters is stochastic and is being characterized by a specified prior distribution and the other is also subject to variation. It is shown that there are fairly small changes in the Bayesian estimate of the reliability function when the variance of the shape parameter is small and the scale parameter is being described by various probability distributions.

*Research supported by the Air Force Office of Scientific Research.

12:00 am PS-27 Estimation of the Three Parameters of the Weibull Distribution CHRIS P. TSOKOS, RICHAR WELCH, U.S.F. The general Weibull probability distribution function, $f(x;\alpha,\beta,\gamma) = \beta/\alpha\ (x-\gamma)^{\beta-1} \exp\{- 1/2(x-\gamma)^{\beta}\}$, depends on the three parameters α,β,γ. The problem of the estimations of the parameters from sample data when $\gamma = 0$, or $\gamma = 0$ and $\beta = 1$ (the exponential distribution), has been well covered in the literature. The estimation of nonzero γ, however, has been largely ignored. In this paper, implicit maximum likelihood estimators for the three parameters are derived and an iteration scheme is developed to compute these estimators from experimental observations. A Monte Carlo simulation is performed for various values of the sample size, n, and the error of each estimator is analyzed as a function of n.

12:15 pm PS-28 Spectral Analysis of Mosquito Population Behavior STEPHEN SMEACH, CHRIS P. TSOKOS, Univ. of South Florida. The techniques of time series analysis are presented and are applied to some non-stationary time series records of mosquito densities in order to obtain an effective analysis.

Univariate spectral analysis is performed on the non-stationary stochastic realization of the mosquito data over a one and two year period. Estimates of the power spectrum are obtained using appropriate "lag windows", such as, Bartlet, Tukey, and Parzen's. Meaningful intepretations of the spectrum of the mosquito density series is given.

SCIENCE TEACHING SECTION

Friday 9:00 am Room Science 204

Jack Armstrong, Florida Technological University, presiding

9:00 am ST-1 Using the 'Mystery Box Experiment" to Teach For Quantitative Reasoning, Frank M. Dudley, University of South Florida. A critical discussion of the application of an indirect approach to the solution of scientific problems that cannot be solved by direct methods of measurement and/or analysis. More specifically, the identification and quantitative measurement of certain sub-atomic particles must be measured indirectly. These particles analogous to the "mystery box" cannot be seen nor measured by any direct method. Other methods of indirect measurement and identification involve a logical and systematic approach to obtaining the evidence needed to positively identify the particles. Much of the work relevant to the structure of matter, models that represent its structure, and the verification of the evidence needed to build the models confront the student in all areas of science. It is the responsibility of the instructor to devise methods of approach that will best serve the student to work in indirect methods of problem solving. The student needs skill in quantitative reasoning in order to work effectively with methods of discovering and quantitizing data. The "mystery box Experiment" helps to develop this skill.

9:20 am ST-2 The Effects of Behavioral Objectives on Learning: Implications for Science Instruction. DENNIS BAKER - University of Florida -- This paper will describe a study conducted to investigate the treatment effects of prior knowledge of behavioral objectives as measured by student achievement in a unit of instruction on sex education for high school students. A review of empirical studies on the effects of behavorial objectives on learning is also included.

9:40 am ST-3 **Psychodynamics (Dimensions of the Mind)---William Trantham, Florida Keys Community College---This paper will describe the development and implementation of a community college course designed to explore and demonstrate the capabilities of the human mind by group involvement in biofeedback, hypnosis, hyperemperia, and parapsychological experiments.**

10:00 am ST-4 The Florida Foundation for Future Scientists. E. F. Abbott, University of Florida, Gainesville, Florida. The Foundation is a state-wide non-profit organization established some years ago to encourage careers in science and engineering among the young people of the state. Two important FFFS-sponsored events are the Annual Florida State Science Talent Search and State Science/Engineering Fair; both are next to take place April 10-12, 1975, at Jacksonville Beaches Auditorium and Community Center. The Florida Academy of Sciences traditionally co-operates with these and other projects of the Foundation. Various business, industrial, service, and technical societies also lend professional and monetary support to the programs.

This report briefly explains the purpose of the FFFS and lists the several functions of the Foundation that encourage and reward achievement. The prize-winners will be shown particularly to illustrate the use of display as a technique for presentation of research processes and results.

10:15 am Room Science 204

Business Meeting of the Sience Teaching Section

H. Edwin Steiner, University of South Florida, presiding

10:30 am COFFEE BREAK

10:45 am ST-5 Junior College Student Attitudes and Achievement in an Independent Study Science Course, by CHARLES J. MOTT, St. Petersburg College - Clearwater Natural Science Department -- Attitudes and achievement of 40 students randomly assigned to an independent study (auto-paced) section of Earth Science are compared with attitudes and achievement of 150 students assigned to a chronologically fixed (instructor paced) course.

Data indicate that, while some students do well in the auto-paced system, most feel that they would have fared better under conventional circumstances.

Instructor time spent in the independent study section was more than double than time spent with students in the instructor-paced sections. Comparison of final grades indicates no difference in achievement for students in both groups.

11:05 am ST-6 What Should Science Teachers Know About Students' Reading Difficulties? F. D. Breit, A. J. Lowe, F. L. Prince, University of South Florida, Tampa, Florida. A discussion paper on how USF is meeting the new state reading requirement for Science Education majors. Course content, in-school experiences, and assignments will be explained. The unique features of the Science Education area's "Reading in Science" course will be highlighted.

11:35 am ST-7 Introductory Botany. TERRY W. SNELL - - A method is discussed which is useful in converting a traditional mass lecture course in introductory botany to a course utilizing behavioral objectives and frequent testing. The approach is a modified Keller method based on principles of contingency management and does not require additional manpower or audio-visual equipment. A single lecture was given weekly with the remaining two, one hour meetings used for testing (initial and remedial) and discussion. Contingencies were arranged using a point system which encouraged remedial work to improve poor initial test performances. Because of course design, the instructor was able to develop more discussion and have more individual student interaction. The proportion of students mastering the material at the 90% level was 16% using the traditional lecture method compared to 48% using the modified Keller approach. On student evaluations the course was described as being easier than others and students indicated they learned more and made better grades. With this approach, the transition from a mass lecture course to one which is more mastery and where communication is primarily via written rather than verbal means, can be greatly facilitated.

Friday 12:50 pm Collegiate Room, Cafeteria

Annual Business Meeting of the Florida Academy of Sciences

Robert W. Long, University of South Florida, presiding

Friday 1:30 pm Room Science 137

SYMPOSIUM - LANDSPREADING OF SECONDARY EFFLUENTS

Rudy J. Wodzinski, Florida Technological University, presiding

7:00 pm Collegiate Room, Cafeteria

Annual Banquet of the Academy

SOCIAL SCIENCES SECTION

Friday 8:45 am Room Science 206

EDUCATION AND LEARNING

Mark Stern, Florida Technological University, presiding

8:45 am SS-1 Psychodynamics (Dimensions of the Mind)---William Trantham, Florida Keys Community College---This paper will describe the development and implementation of a community college course designed to explore and demonstrate the capabilities of the human mind by group involvement in biofeedback, hypnosis, hyperemperia, and parapsychological experiments.

9:00 am SS-2 Conceptual Reality of Marking Conventions in Phonemic Categorization, S. I. RITTERMAN, R.G. SCHWARTZ, S.C. BLOCH, and A. A. ZENNER, Univ. of South Florida.-- This study examined the relative importance of marked and unmarked phonetic features in the assignment of phonetic similarity and dissimilarity. Similarity judgements of English speech sounds were obtained from 52 white high school graduates. An ABX design was utilized in which consonants differed by a marked feature and/or marking for a particular feature. Results indicated that: (1) a large percentage of subjects do not make temporally reliable judgements of similarity and dissimilarity, and (2) universals at the feature level for perception and discrimination may not be appropriate. The bases for these conclusions were from: (1) variability due to the subjects tested, (2) variability due to stimuli utilized, (3) intra-subject variability and reliability, and (4) intersubject variability.

9:20 am SS-3 A Test of the 'Female Fear of Success' Hypothesis, MARCIA STERN, F.T.U..--The objective of this study is to test Horner's hypothesis of 'fear of success' being a primary motivation in females. This 'fear of success' syndrome may help explain why there are few females in important societal positions. Horner's hypothesis is derived from subject performance on a projective test technique. The present study examines the hypothesis that females who 'exhibit fear of success' on Horner's projective test will tend to avoid success in actual task performance. A specific task is undertaken by subjects and a behaviorally based test of the female 'fear of success' hypothesis is carried out.

9:40 am SS-4 Generational Differences in Attitudes Toward the Women's Liberation Movement: A Comparison of College Coeds and Their Parents, ROGER HANDBERG and MARK STERN, F.T.U. --This study presents initial exploratory evidence on differences in the attitudes of college coeds and their parents towards the women's liberation movement on several dimensions: equal job opportunities; marriage and family roles; female involvement in careers; and empathy for the movement. Coeds and their parents are compared in their assessment of feminist-related political issues and feminist personalities. Feminist and non-feminist subjects are compared on various standard measures of psychological and participant orientations, e. g., individual efficacy, political efficacy, political participation, and political awareness.

10:00 am COFFEE BREAK

10:15 am Room Science 206

Business Meeting of the Social Sciences Section

Stuart A. Lilie, Florida Technological University, presiding

10:30 am Room Science 206

SYMPOSIUM ON ENERGY POLICY IN FLORIDA

Joel Gottlieb, Florida International University, presiding

10:30 am SS-5 Energy Policy in Florida: Policy and Implementation, JOEL GOTTLIEB, Florida International University. --A draft of Florida Energy Policies will be presented by a representative of the Florida Energy Commission. Reactions to the proposed state policies will be made by representatives from the social and physical sciences.

Friday 12:50 pm Collegiate Room, Cafeteria

Annual Business Meeting of the Florida Academy of Sciences

Robert W. Long, University of South Florida, presiding

Friday 1:30 pm Room Science 137

SYMPOSIUM - LANDSPREADING OF SECONDARY EFFLUENTS

Rudy J. Wodzinski, Florida Technological University, presiding

3:30 pm COFFEE BREAK

Friday 3:45 pm Room Science 206

INTERNATIONAL POLITICS AND RESOURCES

Douglas C. Smyth, Florida Technological University, presiding

3:45 pm SS-6 Nationalism and Transnational Enterprise: Variations in Perceptions of Utility of Foreign Investment, FRED HORRIGAN, University of South Florida.

4:00 pm SS-7 The Rhetoric of Global Resource Politics, DOUGLAS C. SMYTH, Florida Technological University.--An analysis of the growing perceptual differences between less developed countries and the developed countries over price allocation, use, consumption and shortages of raw materials and commodities in the world economy.

4:15 pm SS-8 Population Changes and Population Policies in Costa Rica, HELEN L. JACOBSTEIN, Biscayne College.

4:30 pm SS-9 Charcoal Making in Southeastern Kenya--The Environmental Impact of a Subsistence Industry* D.L. Capone, Univ. of Miami.--This paper examines subsistence charcoal production in semi-arid Acacia-Commiphera woodland in southeastern Kenya with specific reference to impact on the vegetation community. Surveys of charcoal burners and dealers were conducted in 1969 and again in 1974. Initial survey data revealed a high volume of production and a high degree of selectivity in terms of species utilized. Interviews in 1974 showed a continuing high level of production despite government attempts to restrict the activity. Preferred charcoal species were observed to have diminished rapidly with the most favored having disappeared completely, while non-charcoal species were generally increasing in abundance. The impact of charcoal making is seen to be a gradual, yet surprisingly rapid, change in

species composition of the Acacia-Commiphera vegetation association. Implications for the total ecosystem are unclear and require further investigation.
*Research supported by MUCIA and the Shell Assist Fund, Univ. of Miami.

4:45 pm SS-10 The First Congress of the Communist International: Propaganda Instrument or Revolutionary Vehicle? JOHN A. WETHINGTON, III, CLIFFORD M. FOUST, University of Maryland -- Histories of the Communist International attempt to illustrate Lenin's domination of the organizational proceedings and his efforts to guide the European masses in their revolutionary acts. This paper examines the propaganda content of the major statements issued by the First Congress and the speeches of the "delegates" at the Congress in 1919. In view of the tentative nature of the revolutionary regime, the hostile stance of both internal and external enemies, and the confusion that reigned at the Congress, the propaganda contents of the Congressional documents and speeches was more important than were attempts to establish a center from which firm revolutionary leadership could emanate.

7:00 pm Collegiate Room, Cafeteria

Annual Banquet of the Academy

AMERICAN ASSOCIATION OF PHYSICS TEACHERS

Saturday 9:00 am Room Science 203

Jack H. Noon, Florida Technological University, presiding

9:00 am PT-1 Alternative Courses for Physics Teachers. I.G. FOSTER, Eckerd College.--Many physics teachers in recent years have searched for courses outside the normal physics, physical science area, very sensibly hoping to attract more students by broadening the appeal of physics. A review of such courses based on reports in the journals and on abstracts of papers presented at meetings will be given. The author will provide a more detailed discussion of several courses of his own design, on color, on experiments for children, on the physical basis of communication and on the skills of physics.

9:25 am PT-2 "Team Teaching an Introductory Biophysics Course" B. J. HENDERSON, Florida Technological University, and M. A. HENDERSON, Rollins College. An introductory, one-quarter, biophysics course for students having only two quarters of noncalculus physics is described. The course centers around the senses: sound and hearing, optics and vision, electricity and nerves. An introduction to feedback regulation of biological systems is included. The course emphasizes the use of physics as a tool to understand biological systems. Each biological system is described by the biology professor in terms of biological structure and function. The physics professor introduces and explains concepts in physics that are relevant to the system being studied. Student response to this approach has been favorable.

9:45 am PT-3 Experiences with Physics of Technology, ALEXANDER K. DICKISON, Seminole Junior College.--During the 1974-75 school year Seminole Junior College has been field testing the new curriculum, Physics of Technology: A Modular Approach. This paper will deal with the advantages and disadvantages of the program, including student success and attitude.

10:00 am PT-4 Physics in Society. J.H. Noon, Florida Technological University. In the Winter quarter a course with this title was initiated using a new format emphasizing discussion. At the first class meeting where a topic is introduced students supply discussion questions. At the second meeting, demostrations and films are shown. At the third meeting, two teams discuss and debate issues raised. Grading is based on written assignments, take-home quizzes and class participation.

10:15 am COFFEE BREAK

10:35 am PT-5 Principles of Quantum Mechanics Introduced Through Magnetic Resonance Experiments. E.F. Strother, Florida Institute of Technology. Basic ESR spectrometers built and used by students in advanced labs, offer a unique opportunity to observe and study many fundamental principles of quantum mechanics. Beginning with the basic resonance condition $h\nu_0 = g\mu H_0$, students are introduced to the quantum concept of the spin Hamiltonian. Under favorable conditions the interactions between nuclear and electron spins can be revealed as hyperfine structure. The effect of unresolved spin-spin and electronic exchange interactions can often be analyzed by simple spectral analysis. Several basic spectrometer systems and microwave techniques, in conjunction with experimental results, will be discussed.

10:50 am PT-6 A Different Problem Solving Course. J.C. Katzin, Florida Technological University. A course developed for non-science, non-mathematically oriented students has been developed in the FTU physics department. Its aims are to develope problem solving capability and willingness to problem solve by confronting both the psychological and technical aspects of problem solving. The psychological aspects are attacked through an analysis of games which are treated as problems. Solutions to these games involve overcoming the same fears which are associated with problem solving. The technical aspects are handled by teaching simple model-making techniques and forcing their use. Strengths and weaknesses of the approach are discussed.

11:20 am PT-7 The Recent Anaheim Meeting of AAPT. Stanley S. Ballard, University of Florida. -- I attended the 1975 annual meeting of the American Association of Physics Teachers, held jointly with the American Physical Society in Anaheim, California in late January. This brief report as Section Representative for Florida features items of special interest to the regional sections. The section representatives met on Wednesday evening, January 29, for much discussion and the election of new officers. M. R. Mayfield, who for three years has been Chairman of Section Representatives and an ex-officio member of the Executive Board, did not run for relection. The section representatives met with the Association officers and editors on Thursday evening as the AAPT Council, the governing body of the Association. Important decisions and action items will be reported.

11:40 am Room Science 203

Business Meeting of the American Association of Physics Teachers

Jack H. Noon, Florida Technological University, presiding

FLORIDA JUNIOR ACADEMY OF SCIENCE

Thirty Sixth Annual Meeting

Thursday, March 20, 1975

9:00 AM - 5:00 PM Registration, Florida Southern College

1:00 PM Annie Pfeiffer Chapel

Presentation of Senior High Experimental Papers

George Ellis, Science Center, Presiding

JAS-1 Powers Related Number Series, Scott Bradley, Merritt Island

JAS-2 A Simple Algorythm for Probabilistic Prediction of Hurricane Tracks, John Dekker, Science Center

JAS-3 Electronic Space Charge Energy Storage, Michael Halem, Cocoa

JAS-4 Observational Study of a Summertime Tropical Tornado, Michael Maier, Satellite High

JAS-5 Immunotherapy of Cancer: Auto and Heterovaccines from Denaturized Malignant Humoral Abstracts Obtained with 9.4 Sodium hypochlorite Solution, Gregory Miller, Rockledge

Intermission - 10 minutes

JAS-6 Development of Computer Sciences for a Real-time Derivation of Orbital Elements, George Ellis, Science Center

JAS-7 A Study of the Combustion Characteristics of a Methanol-Gasoline Fuel System and the Effects of Introducing a 30% Water Content to the System, Ronald Herbanek, Sandalwood

JAS-8 The Effects of Hemichlolinium-3 on Synaptic Transmission in the Vertebrate Retina, Rosaland Rafanelli, Rockledge

JAS-9 Electric Potential and Embryonic Induction: Biochemical Inter-relationships, In Vitro Effects, and Regenerative Aspects, Margaret Ann West, Rockledge

JAS-10 A Spectroscopic Study of 9-Hydrazineacridine and Its Interaction with DNA, Clara Yu, Gainesville

Alternates

A-1 Anti-Trypsin: Physiological Effects of Various Soybeans in Different Levels of Maturation, Mary Pelzer, Merritt Island

A-2 The Use of L-Asparginase, Dichlorophenoxyacetic acid, and Alkaline Phosphatase for the Determination of Chemotherapeutics: Potentials and Side Effects, Jerry Jackson, Rockledge

Thursday, March 20, 1975

1:00 P.M. Branscomb Room 202

Presentation of Junior High Experimental Papers

John Denninghoff, Merritt Island, Presiding

JAS-1 Ionizing Radiation and Chemical Pollutants, L. Maurical Hollaman, Southwest Jr. High

JAS-2 The Study of 2,4-D on Callinectus Sapidus, Stephen Boscovich, Southwest Jr. High

JAS-3 The Effect of Antioxidants on Aging in Drosophilia melonagaster, Jeff Webster, Cocoa

JAS-4 The Effect of Oil Componets on the Freshwater Algae (Chlorella vulgaris), Kent Day, Stone Middle

JAS-5 Invertebrate Learning: Octopus Prove Receptive to Complex Training, Anna Grieshaben, Southwest Jr. High

Intermission - 10 minutes

JAS-6 Diets and Cholesterol Blood Levels, Pattie Mikes, Southwest Jr. High

JAS-7 The Determination of the Tolerance Level of Eschericia coli to Cobalt 60 Radiation, Scott Boyer, Southwest Jr. High

JAS-8 Measuring the Calcium Content and The Thickness of the Eggs of the Pelecanus Occidentalis Using the Standard Ethylenediaminetetra Acetic Acid Titration Method, Alice Senne, Stone Middle

JAS-9 Testing the Feasibility of Producing a Significant Amount of Methan from Eichornia Crassips, Paul Bowman, Stone Middle

JAS-10 Chromosome Mutations in Drosophila Melanogastor: Their Relations to Wing Variences, Leonard McMillian, Southwest Jr. High

Alternates

A-1 The Construction of a Solar Water Heater, Paul Peronard, Stone Middle

A-2 A Study of the Learning Capacity and Memory Retainance of the Marine Anemonefish - Amphiprion clarkii, William Arnold, Central Jr. High

Friday, March 21, 1975

9:00 AM Annie Pfeiffer Chapel

Presentation of Senior High Literary Papers

George Ellis, Science Center, Presiding

JAS-1 Nucleic Acids, Ginger Bruner, Marianna

JAS-2 The Temperature Dependence of Interferon Production in Chick Cells in Vitro, Keith Collins, Merritt Island

JAS-3 The Effect of Host X Tumor Hybrids on the Immunoresponse, Kurt Denningfoff, Merritt Island

JAS-4 Theories on the Causes of Thirst and Thirst Satiation, Denise Hall, Lely

JAS-5 Rotating Chemical Reactions, Gino Mayo, Marianna

Intermission - 10 minutes

JAS-6 Production, Utilization and Characteristics of Orange Peel Oil, Christopher M. Lohse, Cocoa

JAS-7 Organic Molecules on Mars, Mark E. Minie, Science Center

JAS-9 Schizophrenia, Carolyn Vipperman, Marianna

JAS-10 The Creation, Use and Destruction of one of Man's Greatest Achievements....Plastics, Rose Wynn, Marianna

Alternates

A-1 Insect Response to Light and Its Practical Application, Karen Saunders, Lely

A-2 The Effect of Air Pollution on Plants and Their Environment, Charles Cooper, Marianna

Friday, March 21, 1975

9:00 AM Branscomb Room 202

Presentation of Junior High Literary Papers

John Denninghoff, Merritt Island, Presiding

JAS-1 The Effects of Black Holes on the Future Life on Earth, Robert Berry, Kennedy Middle

JAS-2 Methods of Determining the Age and Growth of the Istiophorus americanus and greyi (Atlantic and Pacific Sailfish) John Whited, Kennedy Middle

JAS-3 Extraterrestrial life, Charles Lindsey, Edgewood

JAS-4 Fiber Optics, Craig Reed, Edgewood

JAS-5 The Use of Massive Doses of Alpha Tocopherol to Increase the Rate of Weight Gain in Syvilagus floridanus, Kelly Schofield, Kennedy Middle

Intermission - 10 minutes

JAS-6 Myasthenia gravis, Linda Battin, Edgewood

JAS-7 The Effect of Fifty (50) PPM Nitic Oxide on the Bronchi and Alveoli in the Respiratory Tract of Mus musculus, Mark Oler, Kennedy Middle

JAS-8 The Sexual Transmission of Equine Infectious Anemia to Equae Caballus, Debra Minicus, Kennedy Middle

JAS-9 Power, Power, Everywhere: But Who Can Afford It?, Greg Smith, Edgewood

JAS-10 The Utilization of Liquid Crystals to Intensify the Heat-Energy to a Solar Silican Cell so that the Solar Cell Will Produce More Electricity, Mike Miller, Kennedy Middle

Alternate

A-1 Masers and Lasers, James McDonald, Edgewood

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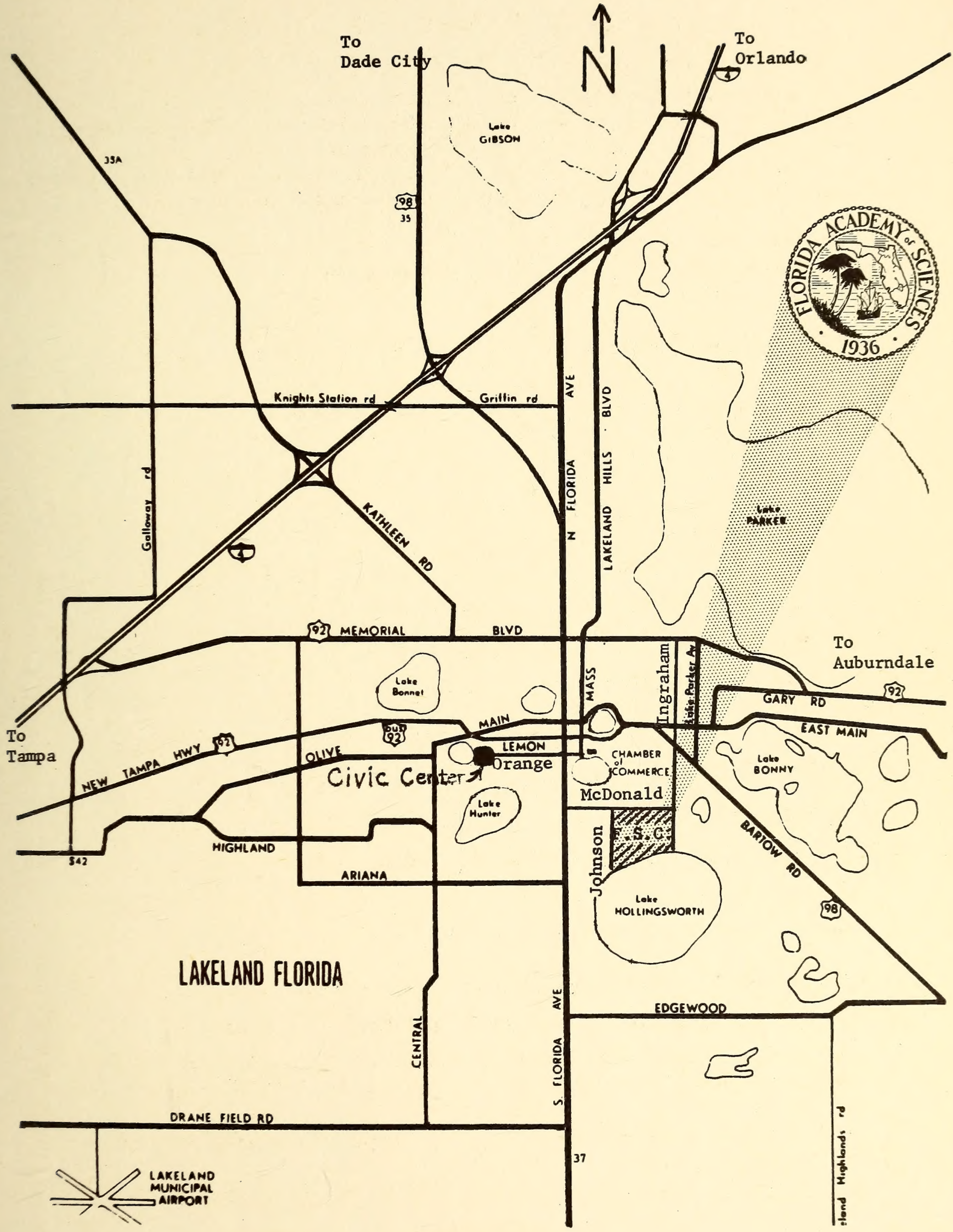
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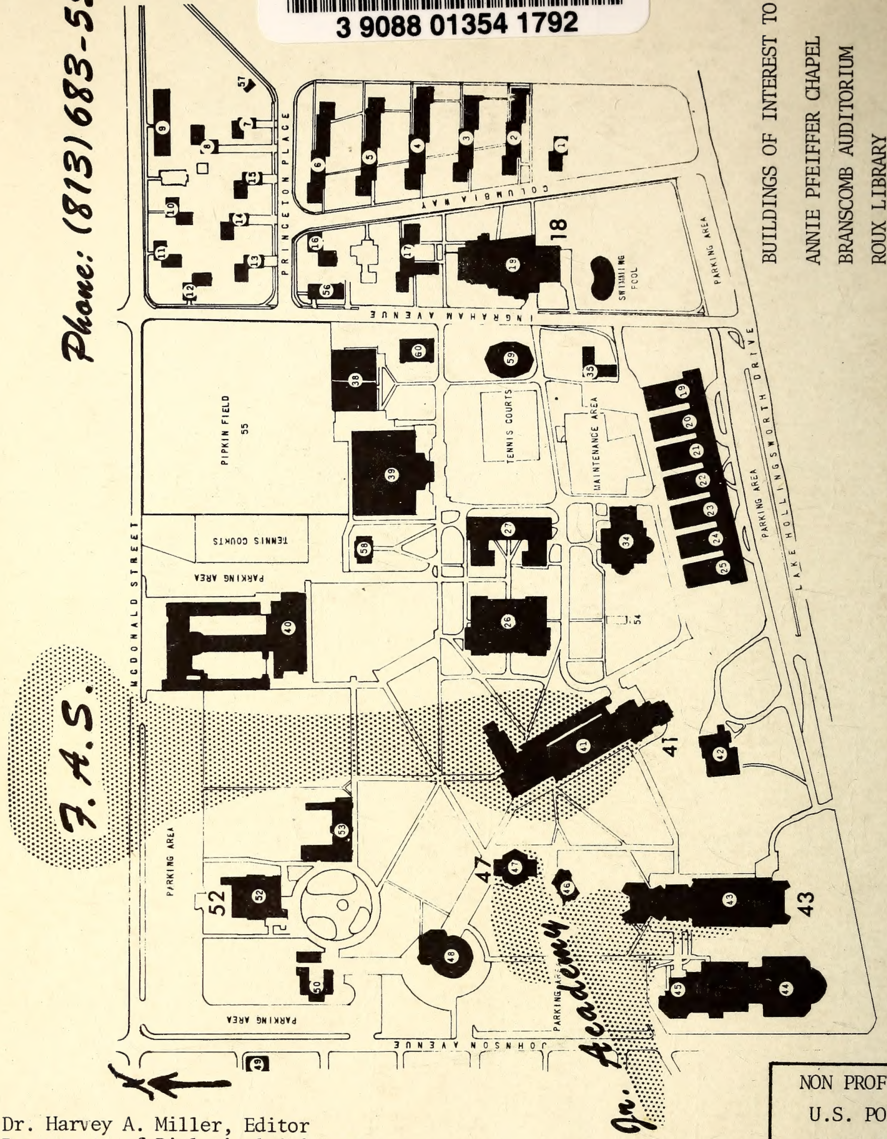

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